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THE ROLE OF STANDARDS, CODES AND SPECIFICATIONS IN A MODERN NAVY

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Eduardo Alberto Pineda Villarroel

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UNITED STATES NAVAL POSTGRADUATE SCHOOL

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THE ROLE OF STANDARDS, CODES AND SPECIFICATIONS IN A MODERN NAVY

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Eduardo Alberto Pineda Villarroel

THE ROLE OF STANDARDS, CODES AND SPECIFICATIONS IN A MODERN NAVY

by

Eduardo Alberto Pineda Villarroel

Lieutenant, Chilean Navy

Submitted in partial fulfillment of
the requirements for the degree of

MASTER OF SCIENCE

IN

MECHANICAL ENGINEERING

United States Naval Postgraduate School
Monterey, California

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ABSTRACT

Without Standards, wars would still be fought with spears. Battles and wars are won by those who get there first with the most, and it's equally true that industry cannot mass-produce the materials of war and get it to the battle first without the most complete Standardization of all component parts that make up modern war equipment.

An over-all Standardization Program for all the Armed Forces is therefore desirable to limit the variety of equipment and supplies in their supply systems; to aid in improving the logistic support; to coordinate certain specific efforts of all individuals in the three branches into the most economical and beneficial operation of the Armed Forces as a whole.

Because of its magnitude, complexity, responsibilities and far-flung activities, an organization such as the Chilean Navy, should find that a high incidence of Standardization, in all facets of their operations, is of utmost importance to their efficiency, effectiveness and success.

In this thesis a compilation of information about standardization is presented in an attempt to demonstrate the important role of standards in a modern navy and to provide a guide for securing the benefits that can be derived from them.

ACKNOWLEDGMENTS

The indebtedness of the author to the numerous organizations and individuals who provided information and suggestions for the preparation of this thesis is too great to catalog; he can offer here only a most inadequate acknowledgment of his appreciation.

The author wishes to take this opportunity to express his deep appreciation to John E. Brock, Professor of Mechanical Engineering, who served as a source of inspiration and guidance in the development of this thesis.

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I

STATEMENT OF THE THESIS PURPOSES AND WHY IT IS IMPORTANT

The purposes of this thesis are to make a compilation of information about Standardization, which will enable me to spread the knowledge of Standardization among the Chilean Navy, to further the study of its principles and its techniques of application toward the establishment of A Standardization Program appropriate for the Chilean Navy; and, if it were possible, to extend all this to the rest of the Chilean Armed Forces toward the more preferred goal of the establishment of One Standardization Program for All the Armed Forces.

Standardization (in the form of Standards, Codes, Specifications, etc.) provides a reservoir of readily available information for immediate use in connection with the economical and expeditious solution to certain design problems; the evaluation of a product; the purchase or acquisition of a product; the method by which an evaluation is undertaken; or as the subject of a challenge to improve the product or the technique of evaluation. A proper application of Standardization in the Armed Forces of Chile can assist them in the fulfillment of their duties and to achieve the most efficient and economic Military Logistic.

Military Logistic is specifically those operations necessary to house, to feed, to clothe, to train, and to ensure the welfare of all military personnel. In addition it is those operations of

determining the equipment and supplies necessary to maintain an adequate defense. This includes purchasing, storage, distribution, transportation, inventory management, financial control, etc. Saying it another way, Military Logistic may be referred to as the 4 R's - ensuring that the right things are in the right place at the right time and in the right quantity. /1/[1]

The next several years are bound to produce substantial changes in Military Logistic. New technologies will require new concepts. At the same time, increasing pressure will occur for more improvements, primarily dictated by the economic squeeze between rising costs and the necessity for modernizing our weapons. The Standardization efforts will play an ever increasing role in maintaining the quality and performance of supplies and equipment which the Armed Forces need and, at the same time, in ensuring that they procure, stock, and issue only those minimum varieties and types of items necessary to support the needs of the Operating Forces.

Because of its magnitude, complexity, responsibility and far-flung activities, any organization such as the Armed Forces, find that a high incidence of Standardization, in all facets of their operations, is of utmost importance to their efficiency, effectiveness and success. A substantial library of Standards, ready and available for immediate use is of key importance to the prosecution of a smoother mobilization.

Standardization is one of the most significant achievements to make to secure uniformity. It is easy to appreciate that without

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[1] References are given in the Bibliography, pages 71-78.

a single identification language, few, if any, plans and efforts for improved efficiency and economy could be successful. With the development of a common supply language, order will replace the current disorder in determination of requirements in relation to inventories and operating programs; procurement; storage and issue; disposal, and other facets of supply function. Development of standard nomenclature and classification is also important for our national defense.

Standardization by itself cannot improve the economic status of anyone, but it is an acknowledged and significant factor in improving industrial productivity. This, in turn, enhances the purchasing power of an hour of labor, which is the essence of improved living standards. It follows logically, therefore, that to further Standardization in the Armed Forces and in the country as a whole offers a significant offset to the pressures of inflation being placed upon the national economy from all sides.

Standardization began to affect industrial productivity a long time ago, beginning with Eli Whitney, who first suggested the interchangeability of muskets. He manufactured a dozen on an interchangeability basis and took them down to the United States Congress. He scattered the parts on the floor and said, "I could put twelve good rifles together from these." And he did just that. /3/

Without Standards, wars would still be fought with spears. Battles and wars are won by those who get there first with the most, and it is equally true that industry cannot mass-produce the materials of war and get it to the battle first without the most complete

Standardization of all component parts that make up modern war equipment.

A huge amount of items are stocked in the military supply systems to meet the logistic requirements. This indicates the possibility of an excess variety.

An over-all Standardization Program for all the Armed Forces is therefore desirable to limit the variety of equipment and supplies in their supply systems; to aid in improving the logistic support, to coordinate certain specific efforts of all individuals in the three branches into the most economical and beneficial operation of the Armed Forces as a whole. There is scarcely a phase of defense supply and property management which will not be aided and will not benefit from one Standardization Program for All the Armed Forces.

It might be well to emphasize here that all the benefits of standardization are not free. To realize the expected savings, money and man-power should be invested in standardization. The experience in the United States indicates that the best way to profit more from standardization is by means of a permanent, well organized program. /8/

Brigadier General Donald Armstrong, USA (Ret.), President of the U. S. Pipe and Foundry Company, proposed a formula for assessing a nation's military potential:

> Manpower, plus economic resources, plus tools, plus skills, plus organization, plus morale, is equal to the national potential, and national potential plus time is equal to actual power. Standardization enters into the formula as one of the management's skills. When we examine the countries behind the Iron Curtain, we see that day by day we are becoming inferior in manpower. War today is a

> conflict of industrial systems. As years go on and manpower, economic resources, and the tools of production increase against us, what hope is there for our country unless the three other factors in the equation - our skills, our organization, and our morale - are maintained at the highest possible level? In view of our present numerical inferiority and our future inferiority in economic resources and in tools, standardization offers one of the most important skills with which to meet that inferiority with hope for the future /7/

This statement of General Armstrong's, intended for the United States of America, applies completely to Chile if we give to the words "behind the Iron Curtain" a more local meaning.

I firmly believe that Chile cannot afford ever to fight a war where the nation does not make the best possible use of everything it has.

An example worth mentioning here is the mobilization of the United States economy as a result of the Korean War. Restrictions on the use of materials, the employment of substitutes, and limitations on a variety of products were beginning to be felt. Standards were again being emphasized as a means of stimulating production with the least possible disturbance of established and orderly practices. It is now a matter of record that the United States successfully re-armed itself in 1950-53 without dislocating the national economy. /6/

If in the future the Chilean nation understands the problem of standardization and visualizes what it can do for the people, not only by saving their money but against that day when war comes, it could be the salvation of the country in permitting Chile to fight a war without so dissipating everything it owns that it will have lost the peace that follows.

II

METHODOLOGY

A. How did the author get acquainted with the problem?

When the author's enrollment in the Advanced Mechanical Engineering Curricula was finally approved by the Chilean Navy, he was confronted with the important decision of selecting a subject for his Master's thesis. He wanted to work on something that not only would fulfill the partial requirement for the degree but that would also be of direct benefit to his Navy.

With this in mind, he went to talk to Professor John E. Brock, told him what were the writer's ambitions about the thesis and asked for his suggestions. Professor Brock agreed that it would be valuable to write the thesis on a subject that will be of interest and useful to the Chilean Navy.

Then he introduced the author to the broad subject of Standardization and explained the potential benefits that could be derived from an appropriate application of this philosophy in the Chilean Navy. The benefits were so obvious and the savings expected so great that the subject became both interesting and appealing.

Shortly thereafter the author decided to write the thesis on the subject of "The Role of Standards, Codes and Specifications in A Modern Navy."

B. What were the general sources of information?

During the second intersessional period the author was able to make a tour which permitted him to call upon the following

organizations which are concerned with Standards in the United States of America:

- U. S. Navy Bureau of Ships
- U. S. Coast Guard
- American Standards Association
- American Society for Testing and Materials
- American Bureau of Shipping
- Society of Naval Architects and Marine Engineers
- American Welding Society
- American Society of Mechanical Engineers

This tour served the purposes of making personal contacts with important people in the standardization field and to obtain general information about the organizations visited. The writer is very grateful for the kind cooperation received from all these organizations and for the valuable information and publications they provided in that opportunity.

The United States Department of Commerce Miscellaneous Publication 230 "Standardization Activities in the United States,"/46/ by Sherman F. Booth, August, 1960, which provides a descriptive inventory of the work of about 350 American organizations involved in Standardization activities; together with the Chapter 5 of the Bureau of Ships Standardization Manual "Using Technical Societies for Standardization,"[1] 10 May 1961, which gives a list of "Typical Professional Societies and Associations" where the Bureau participates in Standardization work; made possible the selection of those activities which are of importance for the Chilean Navy in connection with naval construction, operation, and maintenance.

[1] See Appendix II, pg. 102.

The publications of the International Organization for Standardization (ISO) "ISO Memento 1961" and "General Information on the ISO Member Bodies," which contain general information about the Standards Bodies of more than 40 countries which are members of ISO, enabled the writer to select some foreign activities which are of interest because the Chilean Navy has some units which are of Dutch, French, English, Canadian, and United States manufacture.

Reading in the October 1961 issue of "Materials Research & Standards" the American Society for Testing and Materials Bulletin, the writer learned about the Pan American Standards Committee (Comitè Panamericano de Normas Tècnicas, CPANT) to which belong as Member Bodies the Standards Body of nine countries in the Americas, and decided that for its importance it should also be included in the study along with ISO as international standardization activities.

In the Encyclopaedia Britanica the author found still another important group, the Ships Classification Societies which are international in scope and closely related to the subject of the thesis. Then he decided to include some of the more important of these societies keeping in mind the origin of the naval units of Chile.

After the writer had made this estimated selection of activities to be included in the survey, additional information from the organizations visited on the tour and general information from all the others was requested. In this respect the author wants to express his thanks for the understanding and cooperation received from most of the organizations contacted. As a means of collecting

information the writer sent an inquiry to some 30 of these organizations asking for information about their standards work and was very pleased with the outcome of this inquiry, because he obtained 29 answers which gives 96.7% response that anyone will consider to be outstanding.

C. What are some of the communication problems involved?

At the time of the visit to the headquarters of the organizations included in the tour, the author had barely begun to acquaint himself with the problems and procedures of Standardization and he was unable to formulate specific questions--answers to which would have been of real value in the thesis work.

It was during the visit to the ASTM Headquarters that the author first knew about the existence of The National Institute of Technological Research and Standardization (INDITECNOR), the Chilean Standards Body. Before the author came to this country to study Mechanical Engineering he had little knowledge about the engineering profession or its activities outside the Navy.

Even his knowledge of policy and procedures for standardization in the Navy was vague and rather limited.

As a consequence of the author's lack of previous knowledge of the status of standardization in the Chilean Navy and in Chile as a whole, he was restricted for the determination of it to whatever information he could obtain by writing to the top-level authorities of the Navy and to the Director of INDITECNOR.

The simple fact of being out of Chile for almost three years and so far from it made the author's ambition of making his

work of direct benefit to the Chilean Navy very difficult in many ways. He was not aware of the many changes, innovations, new programs, and present trends that were taking place in it, factors desirable to give the proper orientation to the work.

One problem in obtaining information useful for planning the establishment of a Standardization Program appropriate for the Chilean Navy is that standardization is still an art rather than a science.

Another factor which complicates the study and the collecting of the necessary information is that there are so many different standards organizations in the United States, that there seems to be little standardization in standardization, and instead of getting a clear-cut picture, a rather confusing and sometimes conflicting picture of standardization in this country appears. However, a mass of information which may someday fall into place and prove useful to Chile is included in this study.

D. Evaluation of the information obtained.

The information obtained is not complete: It is what was available for collection in the time available, as a result of requests which were based on the author's limited knowledge of the subject; and on the cooperation of persons or organizations to which requests were directed.

Most of the information about the standardization activities is a little toward the ideal or desirable state of the matter.

It is difficult to obtain in writing more realistic information. When someone writes about the work of his organization to an outsider, he will be more inclined to state the way he wishes the

things to be, instead of the facts.

The author has not been able, do to lack of experience and of more complete knowledge, to fully judge the accuracy of all the information received, but he is sure it was given in good faith.

The scarce data on manpower and dollar budgets for standardization activities are rough approximations, but it is the author's opinion that it is all that can be expected. The writer is aware that this quantitative information is very difficult to develop and that not only may there be a lack of objective information but also that there may be widely varying evaluations of whatever data may be in existence. Also, the facts are probably greatly clouded in commercial circles because of the fact that there is no overall uniform administration of these activities and also because of the fact that the costs of this work are picked up by parent organizations in a variety of ways without adequate cost accounting or without the cost data ever being collected in one place.

There is also some amount of information that could be considered to be of a promotional kind, but it is, in almost every case, concerned with the publications of these organizations.

E. Areas in which information is lacking or unreliable.

Standardization can be applied to almost everything in which it will eliminate any form of waste. In the United States there is a standards organization for almost every field of activity, making a total of several hundred. To this must be added the foreign and international activities. Even after selecting those of importance to the Chilean Navy in connection with naval construction, operation and maintenance, the number was still too large to be

handled in the available time. Only the most important ones or those related to Mechanical Engineering will be considered in this paper.

As a consequence of this, information is lacking in the following fields: Electrical; Electronics; Ordnance; Chemical; and Housekeeping, Subsistence, and Medical Supplies.

The information obtained about the standardization activities in the Republic of Chile and in the Chilean Navy is not enough to do a good job in establishing the present status of them. A considerable part of the initial efforts toward the improvement of the Military Logistic System will have to be dedicated to the complete and accurate establishment of this information.

One of the most important classes of information is the requirements and factors to be considered for setting up and administering a Standardization Program appropriate to the Chilean Navy, but it seems that information of this kind is very hard to come by. More specific data on the administrative organization, the attendant cost and breadth of activity for such a program is strongly needed, keeping in mind that this information is not easily developed nor readily available.

III

STANDARDIZATION IN GENERAL

A. Definitions

Today there are thousands of documents which have been published with the designation "specification" or "standard". One could expect, very logically, that there should be a "standard" definition of these terms. But again the picture is not as clear as one will want it to be. Also, it is realized that there is no generally accepted definition of the term "standardization" itself./9,10,11, 12, 19/ All this constitutes another indication that there seems to be little standardization in standardization. Probably each organization, that participates in the standardization work, has its own definitions and, maybe these are not the same for all their members. In conclusion there still appears to be great confusion and discussion over these basic definitions./13,14,15/

This writer wishes, however, to provide a set of definitions that he regarded as best suited for his purposes. The following definitions contain excerpts from a recent article written by J. Chingas and R. Glie./13/

Standardization - is the organized and continuous process of establishing and implementing the policies concerning routine operations, specifically in the area of recurring problems; selecting the most appropriate solutions to these problems and disseminating them by means of revisable standards and specifications; and maintaining these standards consistent with the state of the art and with efficient utilization of time, manpower, equipment and materials.

Specification - is a concise statement of the requirements for a material, item, process, method, procedure, or service, including, whenever possible, the exact procedure by which it can be determined that the conditions are met within the tolerances specified in the statement.

A Standard - is a specification accepted by recognized authority as the most practical and appropriate current solution to a recurring problem.

Cataloging - is the process of establishing a single name, description and identification number for each item of supply used, purchased, stored, and issued./67/ Cataloging is one of the major segments in a standardization program and is important to manage a supply system.

Simplification.- is the process of reducing the number of types and sizes of items to a minimum consistent with the needs of an operation./9/

Simplification is an essential part of standardization, and is sometimes used synonymously.

Value Engineering (or Value Analysis) - is an objective appraisal of each element of design, manufacture, procurement, installation, and maintenance to achieve only necessary function and reliability at minimum cost./17/

Value Engineering is also an essential part of a material standardization program.

B. Types of Standards and Specifications.

Standards can be of the following general types:

1. Safety standards, usually called "Codes", consist of compilations of design rules, material and product minimum requirements, inspecting, testing, and operating procedures for the protection of life and property. In many cases enforcement depends only upon a contractural agreement, in many others it depends upon an inability to obtain insurance protection without compliance with the code, and in an increasing proportion of cases it depends upon legislation which permits issuance of a license to operate only products or installations which comply./16/
2. Performance standards provide a ready-made basis for agreement between contracting parties for their mutual protection and satisfaction. An example is the AISC "Code of Standard Practice for Steel Structures other than Bridges."/16/
3. Dimensional standards supply an obvious need. They are of two general types: /16/
    a. dimensions applying to a component widely used in many products, such as "Unified and American Screw Threads for Screws, Bolts, Nuts, and other Threaded Parts (ASA B1.1) and
    b. overall dimensions of complete products, such as "Steel Butt Welding Fittings (ASA B16.9).

4. Testing standards provide a basis for assessing compliance with contract or specification requirements, such as the ASME "Power Test Codes". /16/

Specifications may be in the form of Materials or Products specifications and they can be considered together, since all materials are products, and vice versa. The term "material specification" is more appropriate, however, to the complete chemical compositions and limits for a $1\frac{1}{4}\%$ chromium - $\frac{1}{2}\%$ molybdenum steel, while the term "product specification" is more appropriate for "Frogs, Switches, and Turnouts for Coal Mine Tracks. (ASA M7.1,2)."

Materials specifications may be of the "formulation" type which requires that a certain basic raw material be mixed or combined in prescribed proportions and under defined conditions with or without a subsequent treatment by heating, pressure, or agitation to bring about the desired composition./18/

Products specifications can be of two types:

1. Design specifications may be used to specify the construction of a structure, a system, a machine or an apparatus. Sufficient detail is provided by the specifications and accompanying blueprints to enable a manufacturer, who is familiar with the terms used, to erect or fabricate the required construction./18/
2. Performance specifications prescribe the functions which must be performed by a system, a machine, an apparatus, or a product and also the capabilities for which each function is measured./18/

C. Basic Facts.

Standards are not made by art of magic. They have to be developed. This takes a lot of manpower and money as material ingredients plus knowledge, patience, dedication and diplomacy as spiritual contributions from the individuals participating in their development.

The maximum use of standards and encouragement of standardization does not involve any danger of fostering stagnation, slowing progress or stilling innovation. It is realized today that standards are dynamic. They represent the general consensus on what is best for the need at the time of their adoption. However, as soon as more knowledge and experience are gained, those responsible for standards must bring them up-to-date.

The only justification for the planned use of standardization in any organization is the savings to be derived from it. This savings must be evaluated from time to time in order to reactivate or modify the program. In the words of one writer,

> Standardization is not a goal--it is a means, an instrument, a tool. It is good when its effect is beneficial; it is bad when its effect is harmful. /9/

Standards are not the only answer to all the problems of industrialization. But they do benefit individual companies, industries, and national economy by contributing by compensating for the increasing costs of production resulting from higher costs of labor.

> Standards are not substitutes for good engineering. The unintelligent use of standards can be dangerous. All concerned have a serious responsibility to know what they contain and to use them intelligently. /45/

D. Benefits and Savings.[1]

Specifications and Standards provide, or make possible:

1. Sampling, inspection, and test procedures for use in determining that requirements have been met; in addition to clear and accurate descriptions of the technical requirements for the material, product, or service, including design and construction, and component parts.
2. Saving time and effort in determining needs because standards specifications are the result of much experience, trial, and study.
3. References to related specifications and standards, such as marking and packing requirements, which by such reference become an integral part of the requirement which must be met.
4. The purchase of supply items which will result in maximum value being received for the funds expended.
5. Participation by large and small suppliers on an equal basis broadening sources of supply and assuring greater supplier participation.
6. The simplest manner by which the lowest bidder is selected. It is nearly impossible to determine who is the lowest bidder when the item being bought is not supported by a complete specification.
7. Utilization of regularly produced supply items to the maximum extent practicable.

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[1] Abstracted from reference 38

8. Simplification of procurement procedures, better delivery service, and reduced procurement costs.
9. Utilization of nationally known and recognized technical industry standards.
10. A means of assuring that the product being purchased has the characteristics and quality determined essential to requirements and will satisfy the intended use--price and other factors considered.
11. The elimination of unnecessary types, varieties, and sizes of supply items, thereby reducing capital investments in inventories and storage space requirements.
12. Low cost of maintenance and repairs because fewer parts and supplies have to be carried in stock.
13. Engineers released from routine and recurring problems are free for more creative work on special problems, which is very important in these days of technical manpower shortages.

It should be realized that according to the thesis purpose, some of these benefits and savings are more applicable to governmental and military standardization.

Some other great benefits of standardization are largely intangible. It cannot be measured in dollars the countless argument, needless conferences, time-consuming searches in catalogs eliminated through standardization. Standards Manuals are effective as a training device for new personnel to obtain optimum performance in a minimum time.

The benefits for the consumer public are greater availability of goods, more convenience in use, prompter repair or exchange service, better quality, and, most of all, lower prices.

E. Private and voluntary standardization compared with state-directed and mandatory standardization.

One way of making this comparison is by contrasting procedures in the U. S. A. with those in the U. S. S. R.

In the U. S. A.[2] the major part of the standardization work is private and voluntary.

Every company develops standards to satisfy their individual needs. Some industries produce standards of industry-wide scope and for industry widespread use. Also, some of the professional and technical associations include as one of their most important activities the issuance of standards in their field of interest. The Federal Government Agencies and the Armed Forces develop their own standards, which are of mandatory use for them. These government standards are sometimes coordinated with the non-governmental ones.

When the need for fully coordinated standards is established, the procedures of the American Standards Association, the national clearinghouse and co-ordinating agency for voluntary standards, are used to approve standards as American Standards, provided they are accepted by a consensus of all national groups substantially concerned with their scope and provisions.

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[2] Abstracted from reference 42

The American Standards Association (ASA) is a neutral, non-profit institution of governmental, industrial, engineering, consumer, and public agency membership operating in the public interest; financed by industrial, professional and public organizations. ASA maintains a reputation of being free of any partisan interest, be it of a technical, commercial, or political nature.

All American Standards are voluntary, arrived at by a common consent, and are available for voluntary use. However, American Standards are sometimes adopted by a governmental agency or other organizations for mandatory applications, especially when public safety and health are involved.

The ASA has provisions for granting the use of a certification mark indicating conformity with American Standards under the U. S. Trademark Laws. This mark cannot be registered until it has been put into use, but so far no requests for its application have been received.

The opposite is found in the U. S. S. R.[3] where the work in standardization matters is considered a government affair.

The central standardization body in U. S. S. R. is the Committee on Standards, Measurements, and Measuring Instruments of the Council of Ministers of the U. S. S. R., which is completely financed by the State.

The Committee has representatives attached to the.Council of Ministers of all the federated Republics.

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[3] Abstracted from reference 42

The Committee examines and approves the State Standards. But for certain classes of products of special importance the draft State Standards, after being studied by the Committee, are submitted to the Council of Ministers of the U. S. S. R. for ratification.

The decisions of the Committee are made operative by decrees of the Committee President.

The work done in the U. S. S. R. in the field of standardization is inextricably tied in with the essential objectives of the national economy as a whole.

State Standards are the only form of standards which exist in the U. S. S. R. They are considered, once adopted, as obligatory throughout all the territory of the U. S. S. R., and applicable by all organizations and enterprises. The non-application of State Standards entails direct material responsibility. Systematic non-application is punishable by law.

In the U. S. S. R., the supply of technical or industrial products and of goods destined for national consumption is subjected to obligatory marking indicating conformity with State Standards specifications, technical specifications or agreements. The supplier is obliged to guarantee the good quality of the products furnished during the time-limit set forth in the standard. Any supplier delivering non-marked merchandise, in violation of State Standards Specifications, is liable to fine.

After the presentation of these drastically opposed systems, the question of which one is better could be raised. This writer feels that this is a crucial subject, but an examination of this question is a diversion from the actual purpose of the thesis; therefore, an answer will be omited.

IV

STANDARDIZATION AT THE NATIONAL LEVEL

A. Historic background.

The need and usefulness of creating an effective national standardization is as old as the world itself.

> Hammurabi, King of Babylonia, laid down some pretty stiff specifications when he drafted the first building code in history. And Hammurabi minced no words about it. Here's what he said: 'The builder of a substandard house that falls and kills the householder shall be slain.' That was 4,000 years ago. /20/

The construction of Pekin's sewers, with building materials of uniform dimensions is another old example of the application of standardization. In the military field standards are as old as history. The might of the Romans rested largely on the standard formation of their legions and on the standard Roman sword and shield.

The manufacture of guns, ammunition, and their repair parts essential for an army in the battle field, has shown, in many wars, the importance of the interchangeability of military equipment.

In modern mechanized warfare, standardization has become one of the most formidable tasks of the Armed Forces.

B. Importance.

One approach to place the proper value on the benefits of a strong national standardization movement is to consider its relation to significant family, business, community, national, and international affairs.

With the family and its standard of living rising so rapidly, in which "mass production for mass consumption" concept makes this possible, obviously standardization is fundamental.

The manufacturers successfully turn out their products in large numbers at low cost through standardization of the materials selected, tools used, tests applied, and even some construction features affecting installation and operation.

Success in business is irrefutably connected to effective standardization. Apart from the obvious benefits of a "mass production for a mass consumption" philosophy, there are many advantages to be gained from such standardization efforts as drafting standards, which saves millions of dollars otherwise wasted in drafting errors or in training of personnel; or safety standards which have reduced very impressively, the rates of industrial accidents.

Communities and regulatory agencies appreciate the benefits from the standardization of requirements for motor vehicles inspection, traffic signals, and fire hose couplings, which, as the result of fitting the fire engines from all nearby communities, permit mutual assistance in cases of severe emergency.

International affairs are also affected by standardization. A more effective international standardization movement will increase the opportunities for foreign trade, making possible that equipment manufactured in one country could be used in another. In fact, differences in national standards can be a stronger trade barrier than import quotas, currency restrictions or high customs tariffs.

There is an old Spanish adage which says "...People really know the value of what they have when they have lost it..."

Imagine if there were no standards in the world! /36/

How would everybody live and work?

Imagine each railroad had their own track gauge instead of a standard gauge!

Imagine no standards were used in the manufacture of automobiles!

Imagine there were no standard grades of gasoline!

Imagine the traffic lights were different in each city and in each state!

Imagine there were no standards specifications! How would purchases be made?

Mr. E. J. Boersig /36/ defined it nicely in a recent talk when he said

> Standardization shouldn't be regarded as something unpleasant, complicated - or as an arbitrary rule that somebody made just to hamstring us. On the contrary, standards were born of necessity to eliminate confusion.

C. Present Status

Many people in the design professions and in business agree that it makes sense to develop better national standards for dimensions and definitions, for testing and performance, and for safety. Almost everybody agrees that those standards are important; that they save money; that they protect life and property; and that many more of them are needed.

C. Membership.

The American Petroleum Institute has two types of membership: company and individual.

Any company with its principal office in the United States, Canada, or Mexico, engaged in the petroleum or an allied industry shall be eligible to company membership.

Any resident of the United States, Canada, or Mexico, over the age of 21 years, of high character and good standing, engaged directly in the petroleum or an allied industry, shall be eligible to active individual membership on payment of annual dues. Members are encouraged to enroll also in one or more of the divisions of the Institute.

D. Finances.

The Institute is supported by both individual and company membership contributions. The substantial part of the Institute budget, however, comes from company support to the administrative budget of the Institute. The budget is raised on a formula which permits each of the participating companies to share equitably in the support of the Institute.

E. Division of Production.

The Division of Production is concerned with the technology, equipment, and field practices employed in drilling and producing operations.

Among the division's activities are:

1. Development of standards for oil field equipment and materials, and development of recommended practices for care and use of such equipment.

2. Technical and practical studies on drilling and production

practices, including standardization of numerous field and laboratory procedures.

3. Personnel development programs, including vocational training of field personnel and studies on techniques of more effective supervision.

4. Chapter, district, and national meetings for the exchange of information.

Within these broad functional areas is a continuing creation of new committees with specific tasks and a termination of committees which have completed their assignments. Most of the division's specialized committee activities ultimately result in the publication of reports and recommendations to the industry in general.

Equipment manufactured in accordance with the Institute's specifications may be identified by the API official monogram. Today, more than 900 manufacturers in the United States and abroad have been authorized to display the monogram on equipment ranging from one-eighth-inch pipe to mammoth drilling rigs.

Other committees of this division supervise and coordinate forums and regional meetings for the discussion of drilling and production problems, prepare vocational training programs in cooperation with educational agencies, and provide counsel on the development of oil field personnel training programs.

The Division of Production has sponsored the publication of more than 100 reference volumes, bulletins, and periodicals. A list of these, with prices and a brief description of contents, is contained in the API booklet "List of Publications and Materials".

F. Division of Refining.

The Division of Refining considers problems relating to virtually every phase of oil refining operations. Among the areas in which its committees function are improvement of petroleum products, refining technology, operating safety, refinery equipment, and personnel training.

The division serves as a technical forum where members have the opportunity to exchange information concerning the application of general scientific developments in the art of refining petroleum. In addition, Division of Refining activities extend into such areas of public interest as waste disposal and air cleanliness.

The Central Abstracting Service of the Division of Refining publishes "API Technical Abstracts" and "API Abstracts of Soviet Petroleum Technology". A professional staff of technically trained abstracters selects and abstracts articles pertinent to the petroleum industry from about 150 periodicals published in the United States, the United Kingdom, France, Germany, and the Soviet Union and its satellite countries.

In all, the division has 11 working committees whose activities, when coupled with periodic meetings and technical sessions of the whole division, provide ample opportunity for members to exchange information to improve refining operations.

In addition to sponsoring various research projects, the Division of Refining also issues information manuals, recommended practices, and standard specifications.

G. Standardization Work.

The principal activities of the American Petroleum Institute are simplification, standardization, and improvement of equipment and methods

used by the petroleum industry. The fundamental purpose of this activity is to prepare and maintain standards and methods acceptable both to the industry and to the manufacturers of the equipment. This purpose is accomplished through participation by and cooperation of users and manufacturers in the development and keeping up to date of such standards and methods.

The Board of Directors is the governing body of the Institute and, as such, has authority to adopt, modify, or reject proposed API standards and recommended practices. Responsibility for the major portion of the Institute's standardization work lies within its Divisions of Production and Refining, which were formed under a plan of organization adopted in 1929, and its Divisions of Transportation and Marketing, and Department of Technical Services, established more recently.

In the Division of Production (William H. Strang, Director, 300 Corrigan Tower Bldg., Dallas 1, Tex.) the authority to act on matters relating to material standards and recommended practices has been delegated by the Board of Directors, via the Division's General Committee, to the Central Committee on Standardization of Oilfield Equipment. Standing committees, subcommittees, and task groups within the organization of and responsible to the Central Committee, have developed and maintain 46 specifications, bulletins, and recommended practices covering the following: Belting, Cable Drilling Tools, Boilers, Rigs and Derricks, Tubular Goods, Valves, Fittings, and Flanges, Rotary Drilling Equipment, Hoisting Tools, Wire Rope, Oil Well Cements, Production Equipment, and Tanks.

The standardization committees of the Division of Production have

formal representation or informal liaison with numerous societies and associations, including American Standards Association, American Society for Testing Materials, American Welding Society, Manufacturers Standardization Society of the Valve and Fittings Industry, American Wellhead Equipment Manufacturers Association, Society of the Plastics Industry, American Gas Association, American Association of Oil Well Drilling Contractors, and many others.

The Institute grants to manufacturers, upon application and submission of a statement of qualifications, the right to affix its official monogram on material made in accordance with API standards. This certifies to users that the manufacturers have complied with all of the conditions and specifications set forth in the publication covering material so marked. The Institute reserves the right to revoke authorization to use its monogram, for any reason satisfactory to the Board of Directors.

The Committee on Refinery Equipment of the Division of Refining (W. T. Gunn, Director, 50 West 50th St., New York 20, N. Y.) conducts a program of standardization dealing with various features of refinery equipment. Standards covering, (1) Classification of Areas for Electrical Installations in Petroleum Refineries; (2) Specifications for Flanged and Welding-End Steel Gate and Plug Valves for Refinery Use; (3) Specifications for Centrifugal Pumps for General Refinery Services; (4) Specifications for the Design and Construction of Storage Tanks; and (5) Recommended Practice for the Design and Construction of Pressure-Relieving Systems have been published. Projects underway include: Dimensional Standards for Furnace and Heat Exchanger Tubing, Refinery Piping, Metallic Gaskets, Centrifugal Compressors, Mechanical Drive Turbines, an

Electrical Equipment Construction Code, Inspection, Repair and Rating of Unfired Pressure Vessels in Petroleum Refinery Service, and Installation of Refinery Instruments and Control Systems.

The Committee on Disposal of Refinery Wastes has published two collections of standard methods for analysis of, (1) Waste Gases, and (2) Waste Waters.

Transportation equipment used by the petroleum industry is covered generally by Federal and State regulations, but the Division of Transportation (J. E. Moss, Director, 1625 K St., N.W., Washington 6, D.C.) cooperates and assists in the preparation of such regulatory standards. In addition, the Division has fostered the development of standard methods inpipeline construction, maintenance, and operation.

Through its appropriate committees, the Marketing Division (A. J. Rumoshosky, Director, 50 West 50th St., New York 20, N.Y.) encourages the development of standards of materials, equipment (and equipment parts), packages, procedures and product applications which will facilitate competitive replacement, reduce unit costs, promote safe operation, and assist consumers in their identification of general classes of products appropriate for their requirements without limiting, however, the general freedom of choice and variety of approach characteristic of the marketing effort.

The Department of Technical Services (E. O. Mattocks, Director, 50 West 50th St., New York 20, N. Y.) through its several committees has developed standards on Measuring, Sampling and Testing Crude Oil; Crude Oil Tank Measurement and Calibration; Recommended Practice for Measuring, Sampling, and Testing Natural Gas and Natural Gasoline and other Liquid

Petroleum Hydrocarbons; Calibration of Tank Car Tanks and Measuring, Sampling, and Calculating Tank Car Quantities for Pressure and Nonpressure Tank Cars; the Design and Construction of Liquefied Petroleum Gas Installations at Marine and Pipeline Terminals, Natural Gasoline Plants, Refineries, and Tank Farm; Methods of Measuring Evaporation Loss From Petroleum Tanks and Transportation Equipment; and the Preparation of Precautionary Labels. The Fire and Safety Committees have issued a great number of publications dealing with various phases of petroleum activities.

H. Publications.

The API has weekly, quarterly, and annual publications. Special publications and materials are sold at cost to members and nonmembers alike. Available publications are listed in a booklet entitled "List of Publications and Materials". A copy of this booklet is available on request.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)[1]

A. Origin.

The present American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) came into being in 1959 by a merger of the American Society of Heating and Air-Conditioning Engineers (ASHAE), founded in 1894, and the American Society of Refrigerating Engineers (ASRE), founded in 1904.

B. Objective.

Today, ASHRAE is the only professional society devoted exclusively to promoting the arts and sciences of heating, refrigerating, air-conditioning and ventilation, and allied technologies.

C. Membership.

Today, ASHRAE numbers more than 18,000 engineers, architects, contractors, sales executives, scientists and educators. Approximately 100 chapters are scattered throughout the United States and Canada.

D. Organization.

The management of the Society is entrusted to four elected officers--President, First Vice President, Second Vice President and Treasurer and to the Executive Secretary, the immediate Past President, nine Directors-at-Large representing all ASHRAE interests, and ten Regional Directors. General and technical committees, directed by the Board of Directors, conduct the activities of the Society.

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[1] Excerpted from "Your Key to Professional Advancement", "Report on ASHRAE covering the Fiscal Year 1960-61 and A Look into the Future", published by ASHRAE and from Reference 46.

E. Research Activities.

Among ASHRAE's foremost achievements is its research, conducted through a grants-in-aid program to colleges and private laboratories and, from 1919 to 1961, in its own laboratory in Cleveland, Ohio.

From the fundamental and applied research projects sponsored by ASHRAE comes a wealth of information which provides industry with a constant source of knowledge, which advances the status and stature of the heating, refrigerating, air-conditioning and ventilating professions, and which abets human happiness.

All results of the Society's Research Programs are made available through publication in the ASHRAE JOURNAL, GUIDE AND DATA BOOK, TRANSACTIONS and special bulletins.

F. Standardization Activities.

1. Society of Heating and Air-Conditioning Engineers. The Society has taken a keen interest in the development of codes and standards pertaining to heating, ventilating, air-conditioning, and cooling. It has adopted standards relating to the design, testing, or rating of equipment for the heating, ventilating, and air-conditioning of buildings. Some of these standards pertain to: comfort air-conditioning; sorption-type dehumidifiers; determination of thermal conductivity of materials; testing and rating heavy-duty furnaces and direct fired unit heaters; minimum requirements for heating and ventilating garages; testing and rating steam unit heaters and unit ventilators; testing and rating return line low vacuum pumps.

The Society has cooperated with other organizations in the development of standards and codes which it has either endorsed or approved.

Some of these refer to air-conditioning equipment performance and sound output, refrigerant compressors, evaporative condensers, water-cooled refrigerant condensers, mechanical condensing units, forced circulation and natural convection, air-coolers for refrigeration, water and brine coolers, and centrifugal and axial fans.

The Society is represented on committees functioning under the procedure of American Standards Association for a number of projects including: Identification of piping systems; building code requirements for light and ventilation; coordination of dimensions of building materials and equipment; standards for pressure piping, pipe threads, and fittings; safety for mechanical refrigeration; standard refrigeration nomenclature; industrial cooling towers; abbreviations, letter symbols, graphical symbols; drawings and drafting room practice; safety for exhaust systems; acoustics, vibration, and mechanical shock; uniform industrial hygiene standards; fundamentals of performance of effluent air and gas cleaning equipment.

ASTM Committees concerned with standards on which the Society is represented include thermal insulating materials, acoustical materials, gaseous fuels, methods of atmospheric sampling, and analysis. The Society is also represented on NFPA Committees that prepare standards for hospital operating rooms, garages, aircraft hangars, air-conditioning and blower systems.

2. Society of Refrigerating Engineers. An important part of the work of this Society is the development and promulgation of testing standards covering refrigeration and air-conditioning equipment. These standards are developed by project committees consisting of industry

experts operating under the jurisdiction of the Standards Committee.

Currently effective standards cover the following areas: mechanical condensing units; air-conditioners; drinking water coolers; evaporative condensers; water-cooled refrigerant condensers; refrigerant compressors; liquid coolers; air-coolers; capillary tubes; icemakers; bottled beverage coolers; designation of refrigerants; desiccants for refrigerant drying; high-side liquid line driers; cooling towers.

A certain number of standards developed by ASRE are considered to be of interest to other industries. Such standards are processed through the American Standards Association procedures and become American Standards. Those currently in effect cover the following areas: Safety Code for Mechanical Refrigeration; household electric refrigerators; home freezers; refrigeration installations on shipboard; refrigerant expansion valves.

Joint standards are also developed with other engineering groups working in the same areas. Most recent of these is the joint ASRE-ASHAE standard covering air-heating and air-cooling coils.

New standards are always being developed as the need arises. At the present time proposed standards are being written to cover the following subjects: Remote air-cooled condensers; solenoid valves; mechanically refrigerated dehumidifiers; comfort air-conditioning; terms and definitions; packaged chillers; equipment sound testing; unitary air-conditioning equipment; heat pumps.

At the present time ASRE has representatives on standards committees of the following organizations: American Standards Association (21 committees); American Society for Testing Materials (5 committees); American

Society of Mechanical Engineers (2 committees); American Society of Heating and Air-Conditioning Engineers (3 committees); American Institute of Electrical Engineers (1 committee); Building Research Advisory Board (2 committees); National Association of Corrosion Engineers (1 committee); National Electrical Manufacturers Association (1 committee).

3. Society of Heating, Refrigerating and Air-Conditioning Engineers.

The principal Standard published by ASHRAE in 1961 was the Method of Testing for Rating Room Air Conditioners.

Another important Standard, now under proposal, is the Measurement of Sound Power Radiated from Heating, Refrigerating and Air-Conditioning Equipment.

Other standards developed or revised by the Society during 1960-61 include those for: Testing for Rating Water-cooled Refrigerant Condensers; Testing for Rating Liquid Coolers; Testing for Rating Remote Mechanized-draft Air-cooled Evaporative Condensers; Testing for Rating Unitary Air-conditioning Equipment; Testing and Rating Return-line, Low-Vacuum Heating Pumps; Testing for Rating Self-Contained Mechanically Refrigerated Drinking Water Coolers; and Testing for Rating Unitary Heat Pumps for Air Conditioning.

Notable was the adoption of ASHRAE's Designation of Refrigerants Standard as an American Standard through the procedures of ASA.

G. Publications

ASHRAE JOURNAL--published monthly, is the official publication of the Society. It is a high-level technical publication which features the best of the technical papers presented at meetings of the Society.

ASHRAE GUIDE AND DATA BOOK--a complete and annual reference source

for air conditioning, heating, refrigerating and ventilation data. It is prepared by an editorial staff of writers, each an outstanding authority in his particular field. The text is augmented with charts, tables, graphs and illustrations. Alternate annual volumes will contain data on FUNDAMENTALS AND EQUIPMENT and APPLICATIONS.

ASHRAE TRANSACTIONS--an unabridged compilation of technical papers and discussions presented at the national meetings.

RESEARCH REPORTS--the results of important projects directed by the Society's Research and Technical Committees.

CODES and ENGINEERING STANDARDS, as they are developed by the Standards Committee and approved by the Board of Directors.

A list of the standards, books and periodicals, bulletins and miscellaneous publications is published by the Society in "ASHRAE PUBLICATIONS--Price List".

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)[1]

The ASME is a professional society organized to promote the art and science of mechanical engineering and the allied arts and sciences; to encourage original research; to foster engineering education; to advance the standards of engineering; to promote the intercourse of engineers among themselves and with allied technologists; and in cooperation with other engineering and technical societies to broaden the usefulness of the engineering profession.

The ASME By-Laws has the following provisions:

A. Advancing the theory and practice of engineering and the allied arts and sciences by:

(a) Encouraging engineering research; tests and other original work.

(b) Encouraging the preparation of original papers on engineering topics.

(c) Holding meetings for the presentation and discussion of original papers and participating in international engineering congresses.

(d) Publishing papers and reports and disseminating knowledge and experience of value to engineers.

(e) Developing and promulgating standards, codes, formulas and recommended practices.

(f) Offering awards and other honors to encourage contributions to engineering; conferring awards and other honors in recognition of meritorious contributions to engineering.

(g) Furthering the purposes of the Engineering Societies' Library, of which the Library of this Society forms a part.

(h) Encouraging intercourse among engineers for the mutual exchange of knowledge and experience.

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[1] Excerpted from Reference 46 and from ASME Manual MM-2: "Know Your Society", 1959.

B. Enhancing the status of the engineer by:

(a) Maintaining high technical and cultural standards for entrance to the Society.

(b) Cooperating with educational institutions in the maintenance of high standards of engineering education.

(c) Requiring a high standard of ethical practice by members of the Society.

(d) Aiding in the adoption of a high standard of attainment for the granting of the legal right to practice professional engineering.

(e) Fostering among engineering students the study of philosophy and history, tradition and achievement, duties, and social functions of the engineering profession.

(f) Encouraging the personal and professional development of young engineers.

(g) Supporting activities looking to the increased employment of engineers and seeking new opportunities for engineering service.

C. Increasing the usefulness of the organized engineering profession by:

(a) Cooperating with other engineering and technical societies.

(b) Encouraging a high standard of citizenship among engineers.

(c) Encouraging engineers to participate in public affairs.

(d) Cooperating with governmental agencies in engineering matters.

(e) Publicity for the engineering profession through the achievements of engineers.

Since World War II, activities of the Society have greatly increased in size and scope. Membership has grown from 19,000 in 1945 to 47,000 plus 10,000 student members in 1963, with corresponding increase in prestige, obligations and organization.

The Society has 24 professional divisions the titles of which are

indicated by the following subjects covered by them: Applied Mechanics, Aviation, Fuels, Gas Turbine Power, Heat Transfer, Hydraulics, Instruments and Regulators, Lubrication, Machine Design, Maintenance and Plant Engineering, Management, Materials Handling, Metals Engineering, Nuclear Engineering, Oil and Gas Power, Petroleum, Power, Process Industries, Production Engineering, Railroad, Rubber and Plastics, Safety, Textile Engineering, and Wood Industries.

The Society publishes "Mechanical Engineering" monthly and the "Mechanical Catalog" annually. The "Transactions of the ASME" is published in four quarterlies, viz: Journal of Applied Mechanics, Journal of Basic Engineering, Journal of Industry Technology, and Journal of Power Technology.

The standardization activities of the Society have grown very rapidly during the past twenty-five years, until now about 3,000 engineers and others are serving on more than 400 committees for which the Society is sponsor or joint sponsor. In this work approximately 300 organizations cooperate.

The Society was one of the founders of the American Standards Association and its predecessor group, and has placed nearly all of its dimensional, graphical, and safety projects under the ASA Procedure. The Society is sponsor or joint sponsor for 37 committees on standards for screw threads and screw thread gaging; pipe threads and pipe thread gaging; cylindrical limits and fits; wire and sheet metal gages; fire hose couplings; hose coupling threads; bolts, nuts, and rivets; small tools and machine tool elements; gears; pipe; pipe fittings; washers; surface quality; transmission chains; V-belts and V-belt drives; pallets;

identification of piping; automatic control terminology; plumbing equipment; gas cleaning equipment; plastic pipe; cooling towers; nuclear terminology; mechanical shock and vibration; abbreviations; letter symbols, graphical symbols; drawing practice; graphic presentation; pressure and vacuum gages; small sawmills; plant layout; therbligs; steam turbine lubrication; large piston rings; and work standardization. In addition, it serves as sponsor or joint sponsor for 10 more committees dealing with the establishment of safety codes for elevators, dumbwaiters, escalators, and passenger conveyors; manlifts; parking garage equipment; power transmission machinery; compressed air equipment; conveyors; derricks, cranes, and hoists; industrial power trucks; aerial passenger tramways; and nuclear reactors. It also maintains representation on 78 other committees engaged in work on engineering standards.

One of the Society's most notable technical committee accomplishments is the development of the ASME Boiler and Pressure Vessel Code, the last edition of which was issued in 1956. This code, which is divided into eight sections, contains rules for the construction of power boilers to be used in stationary service, boilers of locomotives, miniature boilers, heating boilers, and unfired pressure vessels, as well as the care of power boilers in service and rules for welding qualification. One section contains the specifications for the materials to be used in code constructions. The Society also issues interpretations of these rules, including their application to nuclear power constructions.

The detailed specifications, formulas, tables of dimensions, diagrams and sketches in the code cover plates, tubes, piping, riveted and welded joints, domes, dished and flat heads, braced and stayed surfaces,

stays, headers, access and nozzle openings, safety valves, gages, fittings and appliances, welding, and welding qualification procedure.

Other recommendations apply to efficiency of joints, method for certifying safety-valve capacity, fusible plugs, standard practice for making hydrostatic tests on a boiler pressure part, rules for existing installations, and for the approval of new materials under the code. Sample manufacturers' data report forms, and tables of standard dimensions are also included.

The Society had formerly issued a code for unfired pressure vessels for petroleum liquids and gases. This was prepared by a joint committee composed of representatives of the American Petroleum Institute and the American Society of Mechanical Engineers. By joint agreement of these two groups, this Code was discontinued at the end of 1956, the intent being that Section VIII of the ASME Code which covers Unfired Pressure Vessels would replace it.

There have also been prepared and issued by the Society 28 power test codes, 2 supplementary codes, and 32 auxiliary sections of information on instruments and apparatus. These codes give standard directions for conducting acceptance tests, and for determining the performance of power generating and using equipment.

The "1962 Catalog of Publications of the ASME" gives a complete list of Standards, Codes, Handbooks, and other technical publications of the Society.

AMERICAN SOCIETY FOR METALS (ASM)[1]

The American Society for Metals is a non-profit technical society serving more than 32,000 members in metal using and producing industries of the United States and Canada. These metals engineers are affiliated with more than 115 local ASM chapters located in major centers of production, fabrication and education in the two countries. Today's ASM is an outgrowth of several early societies organized as early as 1913 to provide an interchange of ideas on the practical aspects of metals. ASM's major function is the gathering and distribution of metals engineering information through a comprehensive program of publications and technical meetings.

ASM members carry titles ranging from company president to foreman and laboratory technician. Chapter membership lists show chief engineers, metallurgists, materials engineers, mechanical engineers, designers, projects engineers and all other individuals whose duties involve the selection, fabrication or application of metals. Educational backgrounds of members range from little or no formal training to advance degrees in engineering and science. The universality of ASM services and publications are such that they appeal alike to nuclear scientist and heat treater.

Approximately 70% of ASM's members are employed in metal fabricating industries; 15% in metal producing industries and 15% in research and education.

This Society publishes the ASM Metals Handbook, which contains over

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[1] Excerpted from Reference 46 and from "What Membership in ASM Offers You", American Society for Metals.

300 articles or reports on the application, manufacture, fabrication, treatment, and testing of metals and alloys, both ferrous and nonferrous. These articles and reports have been prepared by individual authors and technical committees. In a large measure they point up practices which are standard, or are likely to become standards, or they summarize data that will be of value to other groups working on standardization. The Society maintains representation on the Intersociety Corrosion Committee of the National Association of Corrosion Engineers, and on the Joint Committee on Definitions of Heat-Treatment Terms. This committee reports jointly to American Foundrymen's Association, American Society for Metals, American Society for Testing Materials, and Society of Automotive Engineers. The ASM does not issue specifications or standards.

Some of the many other publications of the Society are:

Metal Progress--a monthly magazine devoted exclusively to all aspects of metals--their production, processing, fabrication, design, and application.

Metals Review--a monthly news-digest magazine of local and national ASM activities and technical presentations to the chapters by experts.

ASM Review of Metal Literature--a monthly annotated survey of engineering, scientific and industrial journals and books as they pertain to metals developments.

Transactions--annual record of scientific developments in the metal industry, consisting of technical papers submitted for presentation at the National Metal Congress.

Metals Engineering Quarterly--a new publication to make available for permanent references engineering papers presented at national and

regional metal congresses and conferences.

Metals Handbook--the primary authority in metals engineering, with over 1,300 pages of data and articles on 400 subjects relating to the properties and industrial processing of metals.

Technical Books--one hundred texts on the engineering aspects of metals, authored and continually revised by eminent authorities in each field to form an up-to-date reservoir of technical information. A complete list of these books appears in: "ASM Technical Books for the Metal Industry - Catalog and Price List", ASM.

AMERICAN SOCIETY FOR QUALITY CONTROL (ASQC)[1]

A. Origin.

The Society was formed in New York City on February 16, 1946 by the then existing local quality control societies. ASQC is a not-for-profit, educational and scientific Society, composed of over 12,000 members in the fields of quality control, inspection, research and development, statistics, and engineering.

B. ASQC Purposes.

Its purpose is to create, promote and stimulate interest in the advancement and diffusion of the knowledge of the science of Quality Control and of its application to industrial processes.

C. Sections.

The Society is truly a world-wide organization, with Sections located in major cities throughout the United States, Canada, Mexico, Japan, and an International Chapter to which members in countries other than those mentioned above may belong.

D. Divisions and Technical Committees.

Certain specialized industrial fields have established Divisions within ASQC by means of specialized programs at national meetings, and conferences. The Divisions focus the attention of the Society's membership on technical problems and developments in the fields they represent. In addition to the present Divisions, there are specialized Industry Technical Committees active. Presently, these Committees cover these industries and fields: brewing, manufacturing and assembly, metals

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[1] Excerpted from "An Invitation to Membership in the American Society for Quality Control."

vendor-vendee, operations research, and applied methodology. ASQC Divisions function in the following areas of Society interest:

1. Administrative Applications
2. Aircraft and Missile
3. Automotive
4. Chemical
5. Electronics
6. Textile and Needle Trades
7. Food and Allied Industries

E. Standards Committee

This committee has nearly completed its review of the following two ASQC standards:

1. ASQC Standard A1-1951: "Definitions and Symbols for Control Charts"

2. ASQC Standard A2-1957: "Definitions and Symbols for Acceptance Sampling by Attributes"

F. Official Journal of the ASQC

Published monthly, INDUSTRIAL QUALITY CONTROL is the official journal of the Society. Each issue contains valuable information covering pertinent news in the field of Quality Control, activities of the Society and its local Sections, plus practical technical articles.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)[1]

A. Origin and Evolution

This is a national technical society of 12,000 members, formally incorporated in 1902 for the purpose of "the promotion of knowledge of the materials of engineering and the standardization of specifications and the methods of testing." From 1898 there had been an American Section of the International Association for Testing Materials, but it was soon realized that an independent American organization was desirable, particularly to effect needed standardization work.

The Society's work, then, concerns specifically standardization and research in materials. It is, and has been for 60 years, specifically interested in the quality and tests of materials and only indirectly does it become involved in design problems, dimensional standards, and related matters.

As of March 1961, 2,900 standard specifications, methods of tests, and definitions were in effect and hundreds of research projects were under way involving the work of several thousand of the country's leading technical engineers and scientists. All of this work is of tremendous import to American industry, municipal, State, and the Federal governments and other bodies and nations.

B. Membership

Of the 10,260 regular members of the Society, about 2,090 are corporate memberships and the balance are individual members or Federal, State, and municipal departments, universities and technical schools, or

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[1] Excerpted from Reference 46 and brought up-to-date by referring to the "1960 ASTM YEAR BOOK"; to the "1960 ANNUAL REPORT OF THE BOARD OF DIRECTORS," ASTM; and to the "1961 Book of ASTM Standards."

technical societies and libraries. Not included in this field are upward of 1,600 student members at leading technical schools. Over 400 companies support the Society through sustaining membership by contributing dues which are higher than for the regular type of company membership.

In addition to members of the Society, there are about 5,300 other individuals who are active in the Society's committee work, representing various companies which are members of the Society. Thus, all told, there are about 17,500 members, committee members and students.

C. Purpose and Work.

In both phases of the work, standardization and research, the ASTM standing technical committees occupy a most important position. It has been rightly said that these committees are the heart of ASTM. An understanding of their organization and how they function in relation to the parent society is essential.

At the outset it should be stated that the work is of a cooperative nature, and all members of the committees serve voluntarily. The committees function under definite regulations, governing the personnel and methods of procedure. Each committee is made up of three main classes of membership--producers, consumers, and general interests. This latter class comprises independent authorities who have expert knowledge of the materials to be studied, but who are not concerned directly with either their production or use. The "producer" group may not predominate in any committee. It is recognized that no specification covering the quality and methods of testing a material or product will come into wide usage unless it is satisfactory to both the consumer and producer. The ASTM setup is thus fundamental in its standardization procedure, whereby the

producers and consumers of material are brought together on an equal footing.

D. Standardization Procedures.

Proposed standards or revisions of existing standards originate in the committee having jurisdiction in that particular field. After detailed study and work involving methods of determining properties of materials, nomenclature, etc., a proposed standard is evolved which is submitted at a meeting of the committee. Actions affecting the proposed standard are subject to a two-thirds vote at the meeting which must be subsequently confirmed by a two-thirds letter ballot vote of the entire committee. Most of the proposed standards are published in the committee reports which are presented at the next annual meeting of the Society. If accepted at this meeting, the specification or test method is published as tentative for a year or more to elicit criticism and comments of which due cognizance is taken before the committee recommends that the tentative document be adopted by the Society as standard. Each standard before adoption is submitted to letter ballot vote of the entire Society membership and a two-thirds favorable vote of those voting is necessary before adoption.

New tentative standards may also be submitted in the interval between annual meetings. Tentative standards so submitted are reviewed by the Administrative Committee on Standards and if that committee is satisfied that a consensus has been reached in the technical committee concerned in respect to the standard and that it has been developed according to the regulations governing the adoption of standards, the tentative standard may be accepted for publication. This committee can also accept

revisions in tentative standards and approve revisions of standards for publication as tentative.

Each standard is kept up to date by constant surveillance on the part of the respective committees responsible.

E. Research, Knowledge of Materials.

Obviously, research and standardization go hand in hand. C. B. Dudley, the Society's first president, and a pioneer in the development of specifications, after enumerating certain requirements of a workable specification for material, states that "above all it should embody within itself the results of the latest and best studies of the properties of the materials which it covers." Early recognition of this fact and its continued recognition through the years undoubtedly have contributed more basically than any other factor to the wide use and established authority of the Society's standards.

Painstaking investigation and study of experience accumulated over years of service are often required before an adequate specification can be prepared. Agreement must be reached on the properties of materials to be specified and methods of testing them. Due cognizance of manufacturing details, methods of inspection, and marking, should be given.

The Society sponsors research work in different ways, but primarily through the extensive activities of its many standing and research committees. These are correlated by a Committee on Research. This group also has charge of the Research Fund from which contributions are made as the need arises to further worthy research projects. At the present time there are several hundred distinct projects under way, with large numbers of engineers and organizations cooperating.

An important factor also is the opportunity afforded technical and research investigators to give results of their work in papers at ASTM meetings. Each year many such contributions containing important data and information on the properties of materials and their testing are published.

F. Cooperation With Other Groups and the Federal Government.

The Society recognizes the value and importance of cooperating with other organizations both in standardization work and in research activities wherever a common interest exists. Accordingly, the Society has joined with other national bodies in a great many investigative movements. These frequently take the form of join committees. A phase of cooperative work which the ASTM believes is most important in advancing the knowledge of engineering materials is the joint sponsorship with other groups of symposiums held on important engineering topics. The Society has cooperated with such bodies as the American Society of Mechanical Engineers, American Foundrymen's Association, branches of the American Welding Society, Society of Automotive Engineers, and others in this important work.

Among other societies and activities in which the Society is officially represented are the following: National Research Council (Division of Engineering and Industrial Research); Alloys of Iron Research, Engineering Foundation; American Society of Civil Engineers; Structural Division, American Society for Metals; American Ceramic Society; Inter-society Color Council, and others.

The Society, one of the five originators of the American Standards Association, a clearing house for standardization activities, is the

sole or joint sponsor of many ASA projects and more than a third of the standards approved by the ASA were developed and published by the Society.

Numerous divisions of the Federal Government cooperate closely with the Society and its technical committees, and the assistance rendered by the Federal Government and by various branches of the State governments, in particular, highway departments, is invaluable. Particular mention should be made of the cooperation of the National Bureau of Standards and its personnel. The latter is a relatively large group of scientists and engineers of broad training and experience concerned especially with developing factual information on many problems related to materials, and as such bring to the large number of ASTM technical committees on which they are active, an invaluable background. The Bureau personnel is the largest "general interest" group in the Society.

The Bureau has undertaken much important research work for ASTM and the reports and technical papers from the Bureau, which have been published by the Society are no inconsiderable portion of this great mass of technical data.

The Bureau of Mines, Public Roads Administration, Forest Products Laboratory, branches of the U. S. Department of Agriculture, Bureau of Reclamation, Department of Defense, and other Federal departments have rendered much service. All of these groups, of course, receive benefits from this work--many ASTM standards are used by the Federal Government; the Society by publishing various technical contributions from the Federal Government helps disseminate knowledge.

Service branches of the Federal Government are active in ASTM work, the Army, Navy, and Air Force being represented on committees; they help

with various research projects and are vitally concerned with the requirements in ASTM specifications and tests.

It is of interest to note that five of the ASTM past presidents have been associated with the Federal Government, a former director of the National Bureau of Standards; the chief of the Technologic Branch, U. S. Bureau of Mines; a brigadier general, U. S. Army Engineers Corps; a former chief of the Chemistry Division, National Bureau of Standards; and the Assistant Director, U. S. Forest Products Research Laboratory.

G. Marking Requirements in ASTM Standards.

Many of the ASTM specifications require that the products covered shall be marked or identified as to name or brand of the manufacturer, kind of material (in case of different grades or classes), certain testing information (hydrostatic test pressure, in case of pipe), and the ASTM serial designation identifying the specific standard.

H. Means of Encouraging and Facilitating the Use of Standards.

Obviously, with all the work and time and money expended in developing standards for materials, some thought has to be devoted to the application and use of the material. To an ever-increasing extent, particularly notable in the past 25 years, the ASTM specifications are applied in industry. In the steel, cement, brick, petroleum and many other fields, the quality of a high percentage of the products is covered by the Society's standards--usually incorporated in a purchase order merely by the number of the serial designation, such as C150-56 which covers Portland cement, the standard having been adopted in its latest form in 1956.

It should be kept in mind that over 10,000 men who are affiliated

with the Society [illegible] members form a great bloc of influence in promoting the use of standards of quality. Also the tremendously increased interest in the whole standards movement has accelerated this use.

I. Publications.

The methods of publishing standards and the very widespread distribution of these publications aid greatly in facilitating their use. For ease of reference the standards are published in collective form and each is also issued in separate pamphlet form. Of predominant interest is the Book of Standards published triennially with supplements in the two intervening years.

The 1961 Book of ASTM Standards, issued in eleven parts, is a triennial publication, with supplements issued in the intervening years. It contains the formally adopted ASTM Standards and the ASTM Tentative Specifications, Methods of Test, Recommended Practices, and Definitions.

The 1961 edition of the Book of Standards comprises over 16,700 pages. To make this amount of material available in books of convenient size and not too bulky and heavy for binding, the standards are issued in eleven parts, as follows:

Part 1--Ferrous Metals Specifications

Part 2--Nonferrous Metals Specifications, Electron Tube Materials, Semiconductors.

Part 3--Methods of Testing Metals (Except Chemical Analysis)

Part 4--Cement, Lime, Gypsum, Mortar, Concrete, Mineral Aggregates, Bituminous Materials, Soils.

Part 5--Asbestos-Cement Products, Masonry Units, Pipe and Drain

Tile, Refractories, Ceramic Whitewares, Porcelain Enamel, Glass, Building Stone, Thermal Insulation, Acoustical Materials, Sandwich and Building Constructions, Fire Tests.

Part 6--Paper, Packaging, Flexible Barrier Materials, Adhesives, Wood, Cellulose, Casein, Leather.

Part 7--Petroleum Products and Lubricants.

Part 8--Paint, Naval Stores, Coal and Coke, Gaseous Fuels, Industrial Aromatic Hydrocarbons, Engine Antifreezes, Industrial Chemicals.

Part 9--Plastics, Carbon Black.

Part 10--Textiles, Soap, Sorptive Mineral Materials, Halogenated Organic Solvents, Industrial Water, Atmospheric Analysis, Wax Polishes.

Part 11--Rubber, Electrical Insulation.

In these eleven parts are included the 2900 ASTM Standards and Tentatives in effect at the time of publication, exclusive of the 61 ASTM Methods for Chemical Analysis of Metals which appear in a separate publication bearing that title and issued in 1960.

Annual Supplements to each part to be published in 1962 and 1963 will contain the newly adopted or revised Standards and new or revised Tentatives. These Supplements should be consulted for changes in status and for current revisions of Standards and Tentatives. The combined Index to ASTM Standards, issued annually, will also be helpful in this connection, and in locating any desired standard.

Special compilations of standards are also issued providing all ASTM specifications and tests in special fields such as petroleum; textiles; coal and coke; electrical insulating materials; cement; rubber products; paint, varnish, lacquer, and related materials; refractories;

chemical analysis of metals, plastics, steel pipe, and many others. Many thousands of copies of these compilations are distributed and a great many industries look on them with favor because of their compactness in giving in a somewhat more convenient form than the Book of Standards the specifications and tests with which the industry is primarily concerned.

The availability of each ASTM standard in separate pamphlet form provides a ready means of use and many thousands of copies of these are distributed annually.

A yearly index to ASTM standards, including tentative standards, is published and distributed without charge. This publication covering some 250 pages gives under appropriate key words the titles of the standards together with the page and full reference to the ASTM publications in which they appear.

A great many of the Society's standards are reprinted by industrial companies and are used in text books and reference publications. Permission to reprint was frequently given; however the Society has recently, for various reasons, invoked a modest charge for the right to reprint the standards when the published material is used for commercial purposes.

Especially notable has been the widespread use of ASTM standards in various building codes such as those recommended by the U. S. Department of Commerce, National Board of Fire Underwriters, Pacific Coast Building Officials Conference, the codes issued by New York City, Chicago, Boston, and others. The Materials Section of the Boiler Code Committee of the American Society of Mechanical Engineers is based on ASTM specifications. There are numerous other related ways in which ASTM specifications are used.

The Society's Bulletin, 'Materials Research & Standards,' published monthly, is effective in promoting the knowledge of the Society's work and stimulating the use of its specifications and tests. Through numerous meetings, the annual and spring meetings of the Society and various local meetings, the importance of standardization work is stressed. Mention should be made of the close cooperation of a great many technical and business journals who with knowledge of the essential nature of the Society's work include technical articles and news accounts of the progress in the field of engineering materials where ASTM functions.

AMERICAN SOCIETY OF TOOL AND MANUFACTURING ENGINEERS[1]

A. Definition of the Profession.

Tool and Manufacturing Engineering is a branch of engineering the function of which is to plan the processes of manufacture, supply the tools and integrate the facilities required for production of products with minimum expenditure of time, labor and materials. The tool engineer uses the tools of production to coordinate the application of technical knowledge with the hard facts of economics.

B. Origin.

The American Society of Tool and Manufacturing Engineers was founded in 1932 by a group of Detroit engineers who originally began meeting to exchange technical information. They incorporated their group as a non-profit corporation in Michigan, and ASTME was born.

C. Objectives.

The objectives of ASTME, then as now, are: To advance scientific knowledge in the field of tool and manufacturing engineering and through its members engage in research, writing, publishing and disseminating such information.

D. Members.

ASTME now has over 42,000 members in 176 senior chapters located in the United States, Canada, Mexico, Puerto Rico, the Philippines and Australia.

E. Standards Activities.

ASTME is not a standards issuing body, but it has a program for

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[1] Abstracted from a private communication of Leslie S. Fletcher, ASTME's Standards Administrator and from "ASTME's Membership Folder."

the promotion of industrial standardization.

The ASTME members, chapters, and committees work on standards which are processed through the ASA. ASTME is sponsor for several ASA Sectional Committees (B52, B67, B87, Z75) and is co-sponsor of B5.

F. Technical Publications.

ASTME publishes a monthly magazine: "The Tool and Manufacturing Engineer." It also publishes handbooks, manuals, treatises and text-books in every area of tool and manufacturing engineering. Technical papers given at meetings and seminars are reprinted annually in "ASTME Collected Papers" for members and industry.

A complete list of the technical publications appears in: "ASTME Publications Catalog," American Society of Tool and Manufacturing Engineers.

AMERICAN STANDARDS ASSOCIATION (ASA)[1]

A. Origin.

In 1918 five leading American engineering societies decided to form a national organization that could coordinate the development of national standards and thus was established the American Engineering Standards Committee. The five founder organizations were: The American Institute of Electrical Engineers, The American Society of Mechanical Engineers, The American Society of Civil Engineers, The American Society of Mining and Metallurgical Engineers, and the American Society for Testing Materials. Three departments of the Federal Government--Commerce, War, and Navy--joined the organization as founding members.

B. Creation.

In 1928 the American Engineering Standards Committee was reorganized and renamed the American Standards Association (ASA).

C. Members: Nature and Number.

The ASA is made up of Member Bodies, Associate Members, and Company Members. The Member Bodies and Associate Members are technical societies, trade associations, consumer groups, and groupings of such organizations. As of November 1, 1960, there were 65 Member Bodies, 58 Associate Members, and 2,216 Company Members. Of the Company Members, 1,981 hold their membership through group memberships arranged by their trade associations. There are 16 such group memberships.

D. Finances.

The ASA is supported by dues from its members in all classes and by the sale of standards. Certain specific projects are supported by funds

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[1] Excerpted from References 42 and 49.

made available from the industries most concerned.

E. Staff.

The staff is directed by a Managing Director, with currently a Deputy Managing Director concerned primarily with membership promotion. The technical work, such as the secretaryships for standards boards which administer the ASA procedures in their assigned fields, are held by ten engineers under the supervision of the Technical Director. The engineers, in general, cover more than one field apiece. The balance of the staff, numbering 64, supply secretarial services to the engineers, the general office services, administer the public relations program and handle the publishing activities of standards approved as American Standards and the monthly MAGAZINE OF STANDARDS, in addition to the distribution of standards to members and the sale of standards to any buyers both domestic and abroad, staff the ASA library, and provide translation services.

F. Organization Structure.

The organizational structure of the ASA is shown in the accompanying chart. The technical governing body is the Standards Council in which all Member Bodies are represented. The detailed work of the Standards Council is performed by fourteen standards boards, each composed of volunteers, and responsible for a particular field of standardization. Final action on the approval of standards is taken by a Board of Review of six members elected by the Standards Council from its own membership. General policy, administration, and financial matters are the responsibility of the Board of Directors, on which the greater part of the directors are elected by Member Bodies on nominations of selected Member

Bodies. The Board also includes ex-officio the officers and certain ex-officers.

G. Functioning.

The ASA does not write standards. The main functions of the ASA are:

To provide systematic means for developing American Standards;

To promote the development and use of national standards in the United States;

To approve standards as American Standards provided they are accepted by a consensus of all national groups substantially concerned with their scope and provisions;

To coordinate standardization activities;

To serve as a clearing-house for information on American and foreign standards;

To represent American interests in international standardization work.

H. Methods Used for Drafting Standards.

American Standards come into existence through three basic methods which operate on the underlying principle that there must be a consensus of all parties at interest.

1. Sectional Committee Method
2. Existing Standards Method
3. General Acceptance Method

These methods are also available for revision of standards. However, a competent organization may be assigned Proprietary Sponsorship for revising a standard under its own procedures and submitting the revision to ASA for approval.

1. Sectional Committee Method.

a. Organization. The Sectional Committee formulates or revises a standard or a group of standards. The membership of all sectional committees must be truly representative of all national groups and organizations substantially concerned with the scope of the standards projects, for example, consumers, producers, and general interests, and should strike a reasonable balance between these groups. Membership in ASA is not essential to participation in the technical operations.

The Sectional Committee may delegate the technical work to subcommittees, especially if several standards are being developed or revised under one project.

The administration of a Sectional Committee is usually in the hands of one or several organizations known as sponsors recommended by the General Conference and approved by ASA through the appropriate Standards Board.

The sponsor has the following responsibility:

(1) To organize the sectional committee.

(2) To ensure that the work is carried out continuously and effectively.

(3) To provide the necessary administrative services.

(4) To keep ASA informed on the progress of the work.

(5) To submit completed standards to the ASA for approval, accompanied by the sponsor's technical evaluation.

Further details in regard to this method are available from ASA Headquarters, 70 East 45th Street, New York 17, N. Y., in a document entitled "The organization and work of ASA Sectional Committees"--PR 27.

b. Operation: The main work of the Sectional Committee consists in thoroughly airing the views of all its members and in blending these views into a form that represents a sound solution, satisfactory to all.

When a Sectional Committee has thus formulated a standard, it will in many cases distribute a draft (proposed standard) to all organizations, companies, and individuals that may have an interest in the standard. The draft may also be published in trade journals.

Criticisms and comments that the committee receives are carefully considered, and, if necessary, changes are made in the draft standard.

The Committee then votes by letter ballot on the final draft of the standard.

If the sponsor believes a consensus is obtained, the draft is submitted to ASA for approval as American Standard. In cases of undue delay on the part of the sponsor in submitting a proposed standard to ASA, a member of the Sectional Committee may make the submittal.

The record of the development of the standard, the tabulation of the vote, the reasons for negative votes if any, the relation to standards previously approved, and any other information bearing on the establishment of a consensus are reviewed by the appropriate Standards Board. The Standards Board may either recommend that the Board of Review approve the standard as American Standard, or it may return the standard to the sponsor indicating objections. When these have been overcome, the sponsor then presents the standard once again to the Standards Board for recommendation to the Board of Review for final approval as American Standard.

If the Board is satisfied that a consensus exists and that all other

ASA rules and requirements are met, the standard is approved as American Standard and published.

c. Responsibilities of a Sectional Committee Member

A representative of an organization that cooperates on formulating a standard under the auspices of ASA has a number of responsibilities that cannot be shifted to ASA.

(1) He is responsible before the general public for the engineering and economic consequence of the standard which he helps to develop.

(2) It is his duty to act on the standard committee in accordance with the policies of the organization which he represents, to keep his organization adequately informed, and to consult with his organization when necessary.

(3) He is expected to carry out the standards work for which he is responsible with administrative orderliness, competence, and reasonable promptness.

2. Existing Standards Method

This is the second procedure under which an American Standard can be created.

An existing standard of any organization may be submitted to ASA for approval as American Standard without going through any of the other recognized channels for developing American Standards.

The approval will be given if the following conditions are met:

(1) The standard must be truly national in scope and recognition.

(2) Proof must be submitted to ASA that those substantially concerned with the scope and provisions of the standard have accepted it.

(3) The standard must not conflict with other standards in its field.

The American Society for Testing Materials is foremost among the organizations that have gotten their own standards recognized as American Standard.

An American Standard approved under the Existing Standards Method will not lose its original identity. Such a standard will continue to carry the title and number assigned by the organization that originated it, in addition to its ASA number and its Universal Decimal Classification for international as well as domestic bibliographic purposes.

3. General Acceptance Method.

This is the third ASA procedure for writing an American Standard.

Here is a typical example of how an American Standard comes into existence by General Acceptance.

When both the metric system and the Anglo-American inch system had been standardized, accurate conversion from millimeters to inches and back again was a problem. The legal conversion factor had to be carried to 506 decimal places.

The issue was complicated by the fact that the British inch is three parts in a million shorter than the U. S. inch. American companies with foreign contracts found the situation awkward and costly.

In the 1930's, therefore, a large automotive manufacturer suggested that ASA approve as American Standard a simpler inch-millimeter conversion factor which would be acceptable for all ordinary industrial purposes.

ASA called a general conference to discuss this suggestion. It was attended by more than 50 national organizations.

The conference agreed on the conversion factor: 1 inch = 25.4

millimeters. This was approved as American Standard and is now in use throughout the world.

The method is suitable for comparatively simple projects that do not require prolonged technical discussions.

Under the method, standards are discussed and agreed upon only at a General Conference. No continuing Committees are formed; however, an *ad hoc* committee may be appointed for minor editorial matters. Groups not represented at the conference, but substantially concerned with the scope and provisions of the standard proposed, can give their comments and vote in writing.

I. Nature of Standards.

The ASA Constitution permits practically all types of standards of national importance to be approved as American Standards. The important types of such standards are:

Definitions, terminology, symbols, and abbreviations;

Standards for materials, performance characteristics, procedure, and methods of rating;

Methods of test and analysis;

Standards of size, weight, volume, and rating;

Standards of dimensional and functional interchangeability;

Standards for industrial and public safety and hygiene.

All American Standards are for voluntary use. If adopted by any authority having code-making or regulatory powers, American Standards may thereby acquire a status of enforceability, but this derives from the action of adoption and not from the standards themselves.

J. Number of Standards Published

As of November 1, 196[illegible], [illegible] [illegible] approved American standards, many of which have been through a number of revisions since original approval.

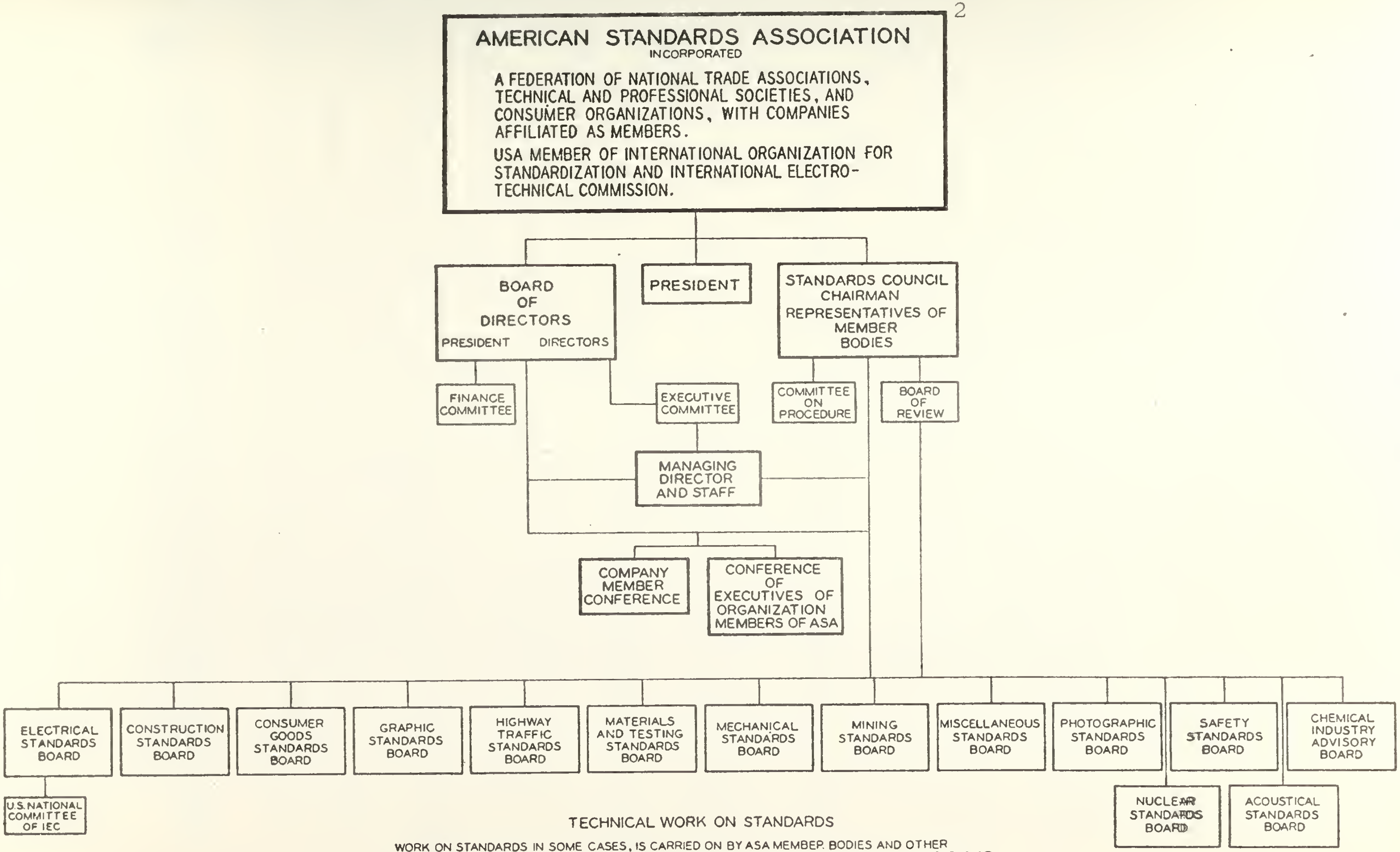
A list of American Standards and some International Recommendations appears in: "Catalog of American Standards, 1961," American Standards Association.

K. Other Periodical Publications

MAGAZINE OF STANDARDS, a monthly publication; proceedings of each National Conference on Standards, which is held yearly; promotion booklets on standardization.

L. Marks Indicating Conformity with Standards.

The ASA has provisions for granting the use of a certification mark under the United States Trade-mark Laws. The mark cannot be registered until it has been put into use, and so far no request for its application has been received. The mark contemplated is a monogram AS either with or without the words "American Standard". The arrangements for the use of the mark do not contemplate that the ASA itself will do any policing other than to purchase in the open market samples marked with the standards mark, subjecting them to all tests in accordance with the pertinent American Standard. The mark scheme is designed to be self-supporting rather than a source of income for the Association.


AMERICAN STANDARDS ASSOCIATION[2]
INCORPORATED
A FEDERATION OF NATIONAL TRADE ASSOCIATIONS, TECHNICAL AND PROFESSIONAL SOCIETIES, AND CONSUMER ORGANIZATIONS, WITH COMPANIES AFFILIATED AS MEMBERS.
USA MEMBER OF INTERNATIONAL ORGANIZATION FOR STANDARDIZATION AND INTERNATIONAL ELECTRO-TECHNICAL COMMISSION.
BOARD OF DIRECTORS
PRESIDENT
DIRECTORS
PRESIDENT
STANDARDS COUNCIL CHAIRMAN
REPRESENTATIVES OF MEMBER BODIES
FINANCE COMMITTEE
EXECUTIVE COMMITTEE
COMMITTEE ON PROCEDURE
BOARD OF REVIEW
MANAGING DIRECTOR AND STAFF
COMPANY MEMBER CONFERENCE
CONFERENCE OF EXECUTIVES OF ORGANIZATION MEMBERS OF ASA
ELECTRICAL STANDARDS BOARD
CONSTRUCTION STANDARDS BOARD
CONSUMER GOODS STANDARDS BOARD
GRAPHIC STANDARDS BOARD
HIGHWAY TRAFFIC STANDARDS BOARD
MATERIALS AND TESTING STANDARDS BOARD
MECHANICAL STANDARDS BOARD
MINING STANDARDS BOARD
MISCELLANEOUS STANDARDS BOARD
PHOTOGRAPHIC STANDARDS BOARD
SAFETY STANDARDS BOARD
CHEMICAL INDUSTRY ADVISORY BOARD
U.S. NATIONAL COMMITTEE OF IEC
NUCLEAR STANDARDS BOARD
ACOUSTICAL STANDARDS BOARD

TECHNICAL WORK ON STANDARDS

WORK ON STANDARDS IN SOME CASES, IS CARRIED ON BY ASA MEMBER BODIES AND OTHER NATIONAL ORGANIZATIONS. IN OTHER CASES, WORK IS HANDLED BY SECTIONAL COMMITTEES OR CONFERENCES ORGANIZED UNDER ASA PROCEDURE AND ON WHICH GROUPS SUBSTANTIALLY CONCERNED ARE REPRESENTED. SUCH COMMITTEES WORK UNDER THE ADMINISTRATIVE LEADERSHIP(SPONSORSHIP) OF ONE OR MORE ASA MEMBER BODIES OR OTHER NATIONAL ORGANIZATIONS. IN BOTH CASES STANDARDS ARE BROUGHT FOR APPROVAL AS AMERICAN STANDARD TO ASA AS THE NATIONAL CLEARINGHOUSE FOR STANDARDS TO THE END THAT A SINGLE CONSISTENT SET OF NATIONAL STANDARDS WILL EXIST. U.S.A. PARTICIPATION IN THE DEVELOPMENT AND APPROVAL OF INTERNATIONAL RECOMMENDATIONS IS CARRIED ON THROUGH COMMITTEES OF ASA MEMBER BODIES AND OTHER NATIONAL ORGANIZATIONS AND COMMITTEES WORKING UNDER ASA PROCEDURE

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[2] From Reference 49

THE AMERICAN WELDING SOCIETY[1]

A. Origin

The American Welding Society Incorporated (AWS) represents the welding engineering profession and all those interested in advancing the knowledge of this increasingly important field.

Founded on the basis of a constitution adopted on March 27, 1919, the Society actually began as an outgrowth of the Welding Committee of the Emergency Fleet Corporation, U. S. Shipping Board.

The Justice of the Supreme Court of New York State approved the Society's Certificate of Incorporation in February 1932.

B. Objectives

The following objectives of AWS clearly summarize its aims and motives:

Encourage in the broadest and most liberal sense the advancement of welding.

Encourage and conduct research, both basic and applied, in all sciences as they relate to welding.

Improve the education and usefulness of personnel engaged in and associated with welding activities.

Engage in and assist others in the development of sound practices for the application of welding and related processes.

Disseminate welding knowledge through its publications, meetings, discussions, consultations, exhibits, and any other available means,

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[1] Abstracted from the article by J. G. Magrath, National Secretary of AWS, "American Welding Society," reprinted by AWS from the May 1957 issue of the "G. E. Review"; and from a private communication of E. A. Fenton, Technical Secretary of AWS.

thereby fostering public welfare and education, aiding in the development of our country's industries, and adding to the material prosperity and well-being of our people.

C. Membership

The 12,450 members of the Society reflect a broad range of occupational and professional interests: 30 percent engineers of various classifications, including draftsmen and designers; 13 percent metallurgists, physicists, and educators; 28 percent plant management, both superintendents and supervisors; 7 percent sales promotion, advertising, and public-relations personnel; 7 percent welding-plant owners and contractors; 7 percent welders; 3 percent miscellaneous professions and occupations; and 5 percent corporation officers of industrial organizations.

D. Sections Activities.

The Society's Sections encourage the exchange of welding ideas. More than 80 Sections located in industrial areas throughout the country service the entire AWS membership. Activities include: talks on latest welding developments and everyday welding problems, educational lectures, welding clinics and live demonstrations, inspection trips to important industrial plants, regional conference and symposia, and social meetings.

E. Technical Activities.

Through its technical committees, AWS serves industry as well as individuals in industry by:

Gathering basic information on welding and allied processes;

Preparing codes, standards, and specifications;

Assisting in relieving conditions where use of welding is restricted or prohibited;

Preparing practical and engineering manuals on welding subjects;

Assisting members in solving day-to-day welding problems by providing requested information.

The Technical Activities Committee supervises the activities of more than 75 technical committees and subcommittees. These produce the Society's Codes, Standards, and Specifications--guides to more serviceable and more attractive welded products and the universally used basis for efficient high-quality production. More than 53 codes and standards cover all phases of welding activity including welding fundamentals, processes, procedures, definitions and symbols, filler metals, testing inspection and control, industrial applications, and safety.

F. Standards and Reports[2]

1. Preparation of Material for Publication. A technical committee may prepare and submit for publication standards such as, codes, specifications, recommended practices or technical reports. Every effort should be made to ascertain that such standards and reports reflect the best industrial practices.

In the preparation of standards or reports, proprietary terms or names shall be omitted except by unanimous vote of the committee and subsequent approval of the Technical Activities Committee.

Patented processes or proprietary materials shall not be referred to as such nor specifically identified, but must be presented in technical terms and referred to by analysis or type. All AWS standards must contain the following statement:

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[2] Excerpted from "Rules of Operation for Technical Committees," American Welding Society.

> By publication of these recommended practices (or standards) the American Welding Society does not insure anyone utilizing the recommended practices (or standards) against liability arising from the use of such recommended practices (or standards). A publication of a practice (or standard) by the American Welding Society does not carry with it any right to make, use or sell any patented items. Each prospective user should make independent investigation.

2. Approval for Publication. All standards and reports must have the approval of the Society before publication. The procedure for obtaining approval for publication is as follows:

a. If the material for publication is prepared by a subcommittee, approval of the subcommittee must be first obtained by letter ballot or meeting vote. In the case of a letter ballot, each negative vote must be accompanied with an explanation. In the case of a meeting vote, all members of the subcommittee must have an opportunity to cast a vote and submit comments. Approval by meeting vote shall require the presence of 75% or more of the membership, otherwise a letter-ballot vote of the subcommittee shall be taken.

All comments and explanations of negative votes must be studied by the subcommittee, and resolved by changes in the original material or dismissed as agreed upon. All negative votes (whether in letter ballot or meeting vote) shall be reported and the members so voting shall be identified.

After approval, the subcommittee shall submit the material to the technical committee for its approval either by letter ballot or meeting vote. In the case of a letter ballot, each negative vote must be accompanied with an explanation. In the case of a meeting vote, all members of the technical committee must have an opportunity to cast a vote and submit comments. Approval by meeting vote shall require the

presence of [illegible] of the membership, otherwise a letter ballot vote of the committee shall be taken. All negative votes (whether in letter ballot or meeting vote) shall be reported and the members so voting shall be identified. Where the technical committee cannot resolve all negative votes for approval, the unresolved comments shall be referred back to the working subcommittee for further study.

Having secured approval of the technical committee, the chairman of the technical committee shall submit the material to the Technical Activities Committee accompanied by letter of transmittal covering history of its development, intended use, and its relationship to existing AWS publications if any.

b. If the standard or report prepared by a technical committee includes or is related to the standards or reports of another AWS technical committee, it shall be reviewed by both technical committees before submitting it for approval of the Technical Activities Committee. Responsibility for completion of a standard or report shall rest with the technical committee in which it was initiated, and this committee shall submit the standard or report to the Technical Activities Committee for approval for publication.

c. Any material intended for publication must be processed as described above and approved by Technical Activities Committee before publication.

d. A technical committee shall, if so directed by the Technical Activities Committee, circulate each proposed standard or proposed revision to an existing standard to a representative group of interested individuals in industry, both producers and consumers, for comment, and

shall give proper consideration to all comments so received prior to presentation of the standard for approval of the Technical Activities Committee. Such circulation may be by direct circulation, by publication in THE WELDING JOURNAL or by publication of notice of the availability of a proposed standard for comment in THE WELDING JOURNAL.

3. The Technical Activities Committee shall not concern itself with the technical content of a standard, which is the responsibility of the technical committee concerned. The function of the former is to make certain that the standard submitted has been duly approved in the technical committee, according to these Rules, and that no conflict exists with other standards and established policies of the SOCIETY.

4. The Technical Activities Committee, when it is satisfied that each proposed "Tentative Standard" and "Standard" is in proper order, shall submit it to the Technical Council, with recommendation as to acceptance and publication. Upon approval by the Technical Council it shall become a standard of the SOCIETY.

5. After a minimum trial period of one year, a technical committee may recommend the advancement of a "Tentative Standard" to a "Standard."

6. Technical committees may hold symposia and technical programs with the approval of Technical Activities Committee in order to obtain information necessary for preparing standards. Such conferences also serve as a medium for dissemination of information prepared by the committee.

7. Technical committees shall review and cooperate in the preparation of standards of other AWS committees as well as those of committees of other organizations.

J. Publications

The Society publishes a monthly magazine, "The Welding Journal." "The Welding Journal" includes informative articles on welding developments, providing useful information for all members--engineers, designers, metallurgists, production personnel, and technical executives. In its pages can be found 6 to 10 articles plus regular editorial departments--such as New Products and Literature, News of Industry, Practical Welder and Designer, Society News and Events--and the Welding Research Supplement, 50 pages of technical reports on welding research work in the nation's university and industrial laboratories.

The basic source on welding information, the "Welding Handbook," includes such subjects as: welding equipment and processes, how to weld the engineering metals and alloys, how to estimate costs and design for welding, application of welding in the major industrial fields, inspection and testing of welds, and welding standards and specifications.

AWS also produces educational and technical manuals, providing through its sales library about 40 additional publications on welding and welding engineering from other organizations.

A list of Codes, Standards, Specifications, and Books on Welding and Allied Processes appears in: "1962 AWS Publications Order Form," AWS.

DIESEL ENGINE MANUFACTURERS ASSOCIATION[1]

This Association has prepared and issued a book on standard practices dealing with stationary engine installations, definitions, equipment, and performance of diesel, dual fuel, and gas engines. It has also issued another publication on marine diesel engine standards, which also covers definitions, equipment, installation, and performance. These publications cover in detail the application of diesel, dual fuel, and gas engines in stationary service, and diesel engines in marine service, the kind of fuel used, lubricating and cooling water systems, and other items relating to engine construction and performance.

The purpose of the books is to be of service to the diesel and gas engine users, prospective buyers, and consulting engineers. The material in these books represents a consensus of practices developed by engine builders, parts and accessory companies, oil companies, and representatives of other associations and societies having an interest in internal combustion engine power plants of the types under consideration.

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[1] Excerpted from Reference 16.

HEAT EXCHANGE INSTITUTE[1]

The Heat Exchange Institute was formed in 1933.

The objects of the Institute are: To promote and further in every lawful manner the interests of manufacturers of heat exchange and steam jet vacuum apparatus and the interests of the public in manufacturing, engineering, safety, transportation and other problems of the industry, and to this end, among other things:

(1) To develop and publish standards for heat exchange and steam jet vacuum apparatus.

(2) To collect and disseminate information of value to its members and to the public.

(3) To appear for its members before governmental departments and agencies, and other bodies in regard to matters affecting the industry.

(4) To promote a spirit of cooperation among its members for the improved production, proper use and increased distribution of heat exchange and steam jet vacuum apparatus.

(5) To increase the amount and to improve the quality of heat exchange and steam jet vacuum apparatus service to the public.

(6) To engage in cooperative research activities.

(7) To promote the common and lawful business interests of its members but not to engage in business of the kind ordinarily carried on for profit or to perform particular services for its members or individual persons as distinguished from activities to improve the business conditions and lawful interests of all of its members.

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[1] Excerpted from By-Laws of the Institute and from Reference 46.

The Institute has [illegible] members, all of whom manufacture heat exchangers and sell their products on the open market. This is a small industry in terms of the number of companies that are in it.

The Institute is financed through the collection of dues which are levied in proportion to the sales of each member.

The Institute is divided into Sections. The scope of each Section covers a specific product or products. The sum total of these Section scopes form the Institute scope. In general, the scope includes only powerhouse equipment, such as, condensers, steam jet ejectors, and deaerators.

The work of the Institute is carried on by technical committees which are continuously engaged in developing standards and keeping them up to date. Through this effort, the Institute has published the following: Standards and Typical Specifications for Deaerators and Deaerating Heaters (third edition, 1953); Direct Contact Barometric and Low Level Jet Condenser Standards (fourth edition, 1957); Steam Surface Condenser Standards (fourth edition, 1955); History of the Development, Manufacture, and Calibration of HEI Standard Flow Nozzles (1946); Method and Procedure for the Determination of Dissolved Oxygen (first edition, 1949); Standards for Steam Jet Ejectors (third edition, 1956).

The Institute also carries on a continuous research program on the heat transfer characteristics of condenser tubes of various materials and types.

Currently the Institute is also compiling technical information based on tests of a proposed standard steam jet ejector.

HYDRAULIC INSTITUTE[1]

The Hydraulic Society was organized in 1917 by sixteen pump manufacturers to help arrange cooperation with the Government in its World War I war production efforts. In 1933 the Society was reorganized and at that time adopted its present name, Hydraulic Institute. The organization has grown steadily in membership until today a majority of the principal pump manufacturers of this country are members.

As a result of its broad membership and its progressive approach to industry problems, the Hydraulic Institute is today recognized as the principal trade association of the industrial pump manufacturing industry. It has become a symbol of progress and service in this field.

The objects of the Institute are: To promote and further in every lawful manner the interests of manufacturers of pumps, as well as the interests of the public in such matters as are involved in manufacturing, engineering, safety, transportation and other problems of the industry, and to this end, among other things:

(a) To develop and publish standards for pumps.

(b) To collect and disseminate information of value to its members and to the public.

(c) To appear for its members before governmental departments and agencies and other bodies in regard to matters affecting the industry.

(d) To promote a spirit of cooperation among its members for the improved production, proper use and increased distribution of pumps.

(e) To increase the amount and to improve the quality of pump service to the public.

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[1] Excerpted from Reference 16 and from "Hydraulic Institute Facts," Hydraulic Institute.

(f) To engage in cooperative educational and research activities.

(g) To promote the common and lawful business interests of its members but not to engage in business of the kind ordinarily carried on for profit or to perform particular services for its members or individual persons as distinguished from activities to improve the business conditions and lawful interests of all of its members.

In general, the activities of the Institute are carried on in four sections of two general types: The product type, of which there presently are three, i.e., Centrifugal Pump, Rotary Pump and Reciprocating Pump Sections. The industry type, of which there is one, the Petroleum, Chemical and Process Industries Group. The basic problems of the different classifications of pumps vary enough so that experience has shown it wise to separate them as indicated. This permits greater attention to the particular types of problems of each unit and avoids submerging the interests of any specific product. Additional product or industry sections can be authorized, as the need arises, by the Executive Committee.

Each Section, or Group, is autonomous and may establish committees as desired. Each Section elects its own officers and functions without supervision except where coordination between Sections or Groups is desirable or where adherence to legal or Institute policies is required. The Executive Committee, guided by Legal Counsel, is the governing body with supervisory powers as assigned to it by the By-Laws.

All questions of policy are decided by majority vote whether in a Section, Group or the Executive Committee. Each member company is allowed one vote on any question put before a meeting or submitted by letter ballot.

Since the Executive Committee is the supervisory body of the Institute, the makeup of its membership is very important. Every effort is made to select the personnel of this Committee so that all segments of the Institute membership are fairly represented, regardless of size, seniority, location or type of product.

The Institute is the publisher of two volumes, "The Standards of the Hydraulic Institute," now in its tenth edition, and "The Pipe Friction Manual."

Three of the five sections of the Standards of the HI are devoted to the basic type of pumps. Each of these sections covers such items as classification, nomenclature, application, rating, testing, and similar phases of pump engineering. A fifth section, the Data Section, devotes itself to friction loss of water and viscous liquids in pipes, data on pipe dimensions, etc., together with complete recommendations on materials of construction for pumping various liquids. The first two sections are devoted to general information about the Institute.

The material in the "Pipe Friction Manual" is an extension and rearrangement of pipe friction data contained in an earlier publication. It is probably the most complete volume available on pipe friction calculations. Its many charts, diagrams, and illustrative examples make it an essential companion to the Standards.

The Institute cooperates with the U. S. Department of Commerce, the American Society of Mechanical Engineers, the National Fire Protection Association, the American Standards Association, and with all of the technical organizations of industries having problems in common with the pump industry.

The Institute is co-sponsor with the Manufacturing Chemists' Association for ASA Sectional Committee B73, Centrifugal Pumps for Chemical Industry Use. It is also represented on several other sectional committees and maintains watchful interest in many more.

Currently the Institute is engaged in a cooperative research program on the handling of fluid-solids mixtures. This is expected to result in a report which may well be the basis for a standard in this new and growing method of transportation of materials.

INTERNAL COMBUSTION ENGINE INSTITUTE (ICEI)[1]

A. Origin

The Internal Combustion Engine Institute, a non-profit organization, whose membership consists of manufacturers of high speed (750 rpm and up) gasoline and diesel engines, both air and liquid cooled, was founded in August 1933, at the time the NRA was in existence.

B. Objects

In brief the objects of the Institute are as follows:

1. To promote the interests of the engine manufacturers.
2. To collect and disseminate data.
3. To cooperate with the various Government Agencies and/or Services.
4. Generally to do such other things as may be necessary to the foregoing results and in so doing to assist the entire Engine Industry.

C. Activities and Accomplishments

Some of the activities and accomplishments undertaken by the Institute and/or its several individual Committees are as follows:

1. Preparing a very complete booklet covering the State gasoline and diesel taxes in each State with additional comments pertaining to certain peculiarities in the laws of each State.
2. The Executive Office acts as a clearing house for National Industrial Council data which pertains to labor relations and general government matters within the scope of the Council.
3. The Executive Office also acts as a clearing house for engine data both domestic and foreign.

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[1] Excerpted from "Information Pertaining to the Internal Combustion Engine Institute," Executive Office, ICEI, and from Reference 46

4. [illegible] of the Engine Industry, (except automotive and aircraft) as taken by the Bureau of the Census and published by them under the "Facts for Industry" series.

5. At the time of the scrap iron shortage several years ago the ICEI Purchasing Committee materially aided the government in its drive to obtain sufficient quantities of this much needed material.

6. The ICEI Engineering and Technical Committee has played an important role in many engineering or technical matters such as:

(1) Developed an ICEI standard test code for gasoline engines and power units.

(2) Developed a set of definitions for engines using fuels such as gasoline, diesel, LP gas, kerosene, etc., in order to eliminate some confusion in previous definitions.

(3) Have cooperated with Government agencies and services.

(4) Have cooperated with the National Fire Protection Association in several of their programs.

(5) Many of the members of the ICEI Engineering and Technical Committee are also members of certain Government Advisory Committees such as the Corps of Engineers, etc.

7. At the time of the OPS, the CPA and the NPA the Institute and its members were looked upon by these agencies as the first contact when making their selection for representatives to their several Industry Advisory Committees. In this connection and due to the close cooperation of the OPS and/or the CPA with the Institute, we were able to develop and present to the agency a series of charts which pointed out

certain inequities by which [illegible] the last engines was planned should their program be [illegible] a [illegible] plan was developed which placed the decontrol on a more equitable basis.

8. The ICEI Service Committee was responsible for the development of the ICEI Basic Warranty which is broad enough to permit the addition of further warranty provisions required by some specific or special application.

9. The ICEI Service Committee also has on many occasions cooperated with many Government Agencies and Services.

10. The ICEI Marine Inspection Committee has been very active in working with the American Bureau of Shipping and Lloyds Register of Shipping in matters pertaining to the inspection of engines and parts and other related equipment inspection requirements. As a result the ABS has changed some of their inspection requirements, which not only eliminated manufacturing bottlenecks but also speeded up production and without jeopardizing the efficiency and quality of the finished product.

11. The ICEI Foreign Trade Committee handles matters pertaining to export and the numerous complications and requirements resulting from the regulations of Foreign Governments. This Committee has on several occasions acted as host in joint meetings with numerous equipment manufacturers, who use engines in their end product, in order to discuss on a common ground foreign regulations which appeared to be detrimental to the export business of those so concerned.

12. Likewise the ICEI Renegotiation Committee acted as host on several occasions for joint meetings with the entire engine industry and presented all an opportunity to question the top officials of the National

Renegotiation Board relative to the [illegible] clarification of many of the Board Regulations. The presence of the Board officials was arranged for by the Institute.

13. The Institute member companies financially supported the Co-ordinating Research Council in the following projects:

(1) The diesel bomb project at Bartlesville, Oklahoma which involved research pertaining to diesel fuels.

(2) The high speed photography project conducted at the Battelle Memorial Institute, Columbus, Ohio.

(3) In addition several of the ICEI member companies are represented on several of the CRC Committees.

14. The ICEI Lube Oil Committee is responsible for the development in June of 1954 of a booklet, "Lubricating Oils for Industrial Engines." This booklet, through the excellent cooperation of over 450 oil companies, listed the various companies and the brands of their product which met the Military, the Supplement 1 and the Series 2 specifications. The first revision was published in August, 1956, and the latest revision is dated September, 1957. All three editions have been accepted by the oil companies as an excellent guide and ready reference, especially in the field.

15. The Institute is a full supporting member of the National Fire Protection Association and as such is fortunate in having representation of the following NFPA Committees where fire protection codes are developed and finalized.

(1) The Centrifugal Fire Pump Committee

(2) The Internal Combustion Engine Committee

(3) The Industrial Relations Committee

(4) The Motor Craft [illegible] Committee

Several of the above committees are now in the process of developing new standards or the revising of existing standards.

16. The Diesel Trade Mark Committee consists of attorneys representing both the Internal Combustion Engine Institute member companies as well as some non-member companies who are familiar with the legal aspects of the trade mark laws in Foreign Countries. The committee members watch for trade mark applications in foreign countries which may embody the word "diesel" either separately or in combination with other words. If the application appears to be damaging to the general trade their protests are lodged against the applicants.

17. The Industrial Relations Committee, which meets as a rule without an Agenda, discusses problems involving labor conditions in various areas in which the company member plants are located, Government labor regulations phases of the Taft-Hartley Act NLRB decisions, SUB-benefits, Right to Work Laws, etc.

18. Other items which might be mentioned and in which the institute is now or has been involved·

(1) International Electrotechnical Advisory Committee TC 19.

(2) National Technical Task Committee on Industrial Waste.

(3) Affiliation with the National Air Pollution Control Committee.

(4) The "Buy American" matter.

(5) The matter of Public Law 413.

D. Membership Qualification

Membership is open to any prime manufacturer of internal combustion

engines, providing such manufacturer produces and sells for general use, other than its own and uses exclusively. Such manufacturers need not be limited to the exclusive manufacture of internal combustion engines.

E. Organization of the Institute--Officers, etc.

The governing body of the Institute rests in the Executive Committee which consists of five (5) members as follows: President, Vice-President, Secretary, Treasurer and one Director (the retiring President). Each year at the February Annual Meeting two new members are elected to the Executive Committee for a term of two years. The Executive Committee elects its own officers such as the President and who upon his election becomes Chairman of the Executive Committee.

F. Regular Members

The Regular Members of the Institute consist of policy-making executives of the member companies. Alternates are permitted to be appointed by the Regular Member, should he himself be unable to attend the Regular Meeting.

G. Committee Members

The members of the individual committees as mentioned above are usually the top Executives of the member company holding an office commensurate with the particular committee of which he is a member, for example: Chief Engineer, Export Manager, Service Manager, Industrial Relations and/or Personnel Manager, the Director of Purchases or Chief Purchasing Agent. Each committee has a Chairman and Vice-Chairman.

H. Committee Operation

The following standing committees meet to discuss problems peculiar to the activities of each; viz, Engineering and Technical, Service and Parts, Foreign Trade, Industrial Relations, Lubricating Oil, Purchasing, Marine Inspection, etc. Such committees meet as required based on specific problems in which they are individually interested.

Each individual committee listed above must after careful consideration of any problem presented for consideration make their recommendations to the Executive Committee for further action and final decision. If in the opinion of the Executive Committee the recommendation requires the approval of the entire membership it is the function of the Executive Committee to so indicate to the Executive Secretary, who places the question before the membership for final decision. No committee can decide the final action to be taken without the approval of the Executive Committee and/or the entire membership.

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY[1]

A. Origin and Object

The present organization was founded in April, 1924, and was the result of preceding groups whose work in standardization dates back to before 1888. All work in both the present organization and its predecessors is confined to standards development and promulgation.

B. Membership

The Society maintains only one class of member; that of Company Member. Members must be manufacturers of valves or pipe fittings. The present membership manufactures about 95% of the valves and fittings produced for commercial and industrial pressure piping application in the United States.

C. Finances

The Society's budget is supported by membership dues and contributions from related trade associations.

D. Standardization Work

The method of carrying on standardization work by the society is by means of committees selected from the engineering departments of representative manufacturers that are directly engaged in the manufacture of valves and fittings.

Initial proposals are reviewed in subcommittees or special task groups. Following agreement, it is reviewed by each higher committee and approved either by consent or by "letter ballot". Letter ballot is

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[1] Excerpted from a private communication of Robert V. Warrick, Executive Secretary, Manufacturers Standardization Society of the Valve and Fittings Industry, and from Reference 46.

carried out according to the [illegible] principle utilized by ASA.

At present the society has [illegible] committees working on subjects covering codes, screw and flanged fittings and valves (ferrous and non-ferrous), marine valves and fittings, marking and terminology, material, screw threads, cast and malleable iron fittings, unions and union fittings, water works, welding fittings, butterfly valves, pipe hangers, plastic valves and fittings, quality standards, etc.

The society has now in force approximately 20 standard practices which it has developed and adopted. These are for roughing in dimensions for light radiator valves, union elbows, and returnline vacuum valves; finishes for contact faces of connecting-end flanges of ferrous valves and fittings; spot-facing standard; standard marking system for valves, fittings, flanges, and unions; 125-lb and 100-lb bronze gate valves; specification for leaded red brass and leaded semi-red brass castings for valves and pipe fittings; specification for stainless steel castings for valves, flanges, and pipe fittings; 150-lb corrosion-resistant cast flanges, flanged valves, and flanged fittings; stainless-steel butt-welding fittings; steel pipeline flanges; bypass and drain connection standard; assembly of steel raised face flanges to cast iron, brass, bronze, or stainless-steel flanges; limiting dimensions of raised face flanged gaskets which meet requirements of ASA-B16.5 for Class A Ratings; steel butt-welding fittings (26 in. and larger); 2,000-, 3,000- and 6,000-lb. forged steel screwed fittings; forged steel plugs and bushings; cast iron pipeline valves; and quality standard for steel castings for valves, flanges, and fittings.

In addition, the Society serves as joint sponsor with the American

Society of Mechanical Engineers and the Mechanical Contractors Association of America for the Sectional Committee on Pipe Flanges and Fittings, which resulted in the approval of 16 standards by the American Standards Association. It is also officially represented on 15 additional ASA Sectional Committees working on the following projects: scheme for the identification of piping systems; specifications for cast iron pipe and fittings; dimensional standardization of plumbing equipment; standardization and unification of screw threads; pipe thread, safety code for mechanical refrigeration; bolt, nut, and rivet proportions; code for pressure piping; hose coupling screw threads; standardization of dimensions and materials of wrought iron and wrought steel pipe and tubing; classification and designation of surface qualities; standardization of pallets; standardization for drainage and drafting room practice; graphical symbols and abbreviations for use on drawings. It is also represented on Committees of the American Society for Testing Materials dealing with development of specifications for steel tubing and pipe; valves, fittings, piping, and flanges for high temperatures and subatmospheric temperatures; gray iron castings, malleable iron castings; iron chromium, iron chromium nickel, and related alloys; copper base castings and ingots for remelting; plastic pipe and fittings; and nondestructive testing.

The Society maintains official representation on committees of the ASME, American Welding Society, National Board of Boiler and Pressure Vessel Inspectors, National Fire Protection Association, and American Petroleum Institute.

Through its various Committees the Society cooperates with a number

of natural gas pi[illegible] purchasers' [illegible] specifications on valves [illegible] use.

A list of the Society's standards appears in "1961 Third Edition of MSS Standard Practices," [illegible] Standardization Society of the Valve and Fittings Industry.

NATIONAL ASSOCIATION OF PURCHASING AGENTS (N.A.P.A.)[1]

A. Purposes

The purposes of this Association are:

a. To foster and promote interchange of ideas and cooperation among its members.

b. To promote the study, development and application of improved purchasing methods and practices.

c. To collect and disseminate information of interest and benefit to its members, including current production and market data, information on business trends, manufacturing methods and practices, products and their uses, and channels of distribution.

d. To correct trade abuses and encourage maintenance of ethical standards in buying and selling.

e. To encourage and cooperate in the institution and development of courses in the subject of purchasing in colleges and universities.

f. To strive by all legitimate means to advance the purchasing profession.

In the accomplishment of these purposes, it is the policy of this Association to discourage disclosure or discussion of confidential prices or other confidential information.

B. Membership

N.A.P.A. represents a wide diversification of business interests; it has members from large and small units of industrial, educational, governmental, utility and distribution organizations.

The N.A.P.A. has more than sixteen thousand members in ninety-one

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[1] Excerpted from "N.A.P.A.--Organization-Policies-Administration-Objectives," N.A.P.A., and from Reference 16.

affiliated local associations in the United States.

C. Organization

The Association is divided into nine geographical districts. The members of each local association select a National Director to represent them in the Board of National Directors and at the meetings of the District Council. Each district has its own district council, consisting of one national director from each association in the district. The district council elects a District Vice President who serves as Chairman of the Council and becomes a member of the Executive Committee of the N.A.P.A. The executive committee elects the President.

The executive committee, guided by district council recommendations, is responsible for the policies, activities and management of the Association. It refers all matters under consideration to the district councils and through the councils to all affiliated associations and their members, for advisory recommendations.

D. Administration

Each of the nearly one hundred local associations affiliated with the N.A.P.A. retains its independence in the selection and management of local activities. There is no dictation from National to locals, and, to complete this reversal of usual organization procedure, the members, through their local officers, district councils and executive committee, determine the activities which the National shall conduct for them.

The local association coordinates the interests of its members and supplies services and contact values no other agency can duplicate. Through the National, this coordination of interests is expanded

nationally to permit the development of services and activities which no local group could afford to finance, or be recognized as sufficiently representative of purchasing interests to sponsor. Local activities vary with the size and geographical location of the group, the requirements and wishes of its members. National activities follow broad, fundamental lines; are of general interest and value to the members of all local groups, and are available to all members who care to participate in them.

National activities and services are carried on through:

1. National committees having a chairman, district or regional chairmen and members from the various local associations, selected because of their knowledge of the problem or subject to be considered.

2. Group organizations that bring men together from the same industry cooperatively to solve common problems.

3. N.A.P.A. headquarters, located in New York, N. Y., which handles the administrative work and finances of the Association under the direction of the president and executive committee; supplies the secretarial service required by the Association and its committees and groups; furnishes the staff and facilities for the editorial and research work required to carry on Association services and activities.

The resident staff is augmented by consultants whenever necessary. Dr. Lewis H. Haney, Dr. H. E. Luedicke and A. W. Zelomek are retained as consulting economists and McGill Commodity Service is retained for special statistical work. For many years, Professor Howard T. Lewis, of Harvard Graduate School of Business Administration, was adviser on the Association's educational program and the late Dr. Russell Forbes was

consultant on governmental purchasing problems. George S. Brady, Editor, "Brady's Materials Handbook," is consultant on materials.

Other consultants are engaged, from time to time, for special studies or editorial work. Each is selected because of his competent knowledge of the subject to be studied.

E. National Committees

A national committee may be created to handle a specific problem or project, or be a continuing organization that analyzes and reports to members the trends and developments in a commodity or industry. Appointments to national committees are made by the president of N.A.P.A. and are based solely on ability and willingness to handle the job.

Prominent national committees are:

Business Survey Committee--Secures monthly opinions of leading purchasing executives throughout the United States, which are condensed into a composite report published in the Association's BULLETIN, and in news and trade papers.

Coal--In cooperation with the United States Bureau of Mines gathers statistics on available stocks and consumption of coal in the United States, from which a bimonthly chart and report are prepared and published.

Containers--Surveys and reports quarterly on conditions and trends in markets for containers of all types.

Education--Creates, develops and promotes the use of educational material effecting higher standards of practice in the procurement field. Cooperates with colleges and universities on institution of courses in Industrial Purchasing by providing course outlines and published material.

Encourages and cooperates with independent, qualified authors, to produce textbooks and handbooks that will add to the authoritative literature of Purchasing.

A prime project in the National Association of Purchasing Agents schedule for many years has been the development and distribution of manuals, course outlines, industrial film program notes, guides and pamphlets, and other aids by which members may, individually or in groups, add to their practical knowledge. As those items become available, the BULLETIN gives the details.

The work of this committee has thus far resulted in the publication of handbooks entitled Commodity Data Sheets, Purchasing Policies and Procedures, Industrial Purchasing--Principles and Practices, and Materials Handbook. Several additional publications are in various stages of completion. Among the more recent publications are:

Where to Find It! Bibliography of Industrial Purchasing.

Outline of an Intracompany Training Program for Purchasing Personnel.

Improving Purchasing Department Reports to Management.

Suggestions for Development-Recording-Use of a Purchasing Department Manual.

Cutting Costs by Analyzing Values.

Guide to the Selection of [illegible] Buyers.

Fuel Oil--Publishes bimonthly Fuel Oil Market Report with information on production, consumption and stocks that meet the requirements of buyers of fuel oil.

Lumber--Concerns itself with problems of the lumber industry, representing the buyer's interest. Publishes bimonthly survey of opinion.

[illegible] conditions and trends in markets for all nonferrous metals, reporting bimonthly.

Paper--Surveys conditions in industry and publishes report bimonthly.

Steel--Surveys problems of the industry, and cooperates with trade organizations to develop mutually satisfactory trade practices, sales agreements and contract forms. Developed a Color Code for Marking Steel Bars and the Classification for Iron and Steel Scrap, both of which are now national standards. Publishes bimonthly report on market trends and conditions; also research studies on various steel products.

Textiles--Publishes bimonthly report on conditions in the industry.

Value Analysis - Standardization-- Objective is to provide members with information on economies resulting from, and procedures for initiating, programs of value analysis and industrial standardization. N.A.P.A. is a Member-Body of American Standards Association.

A few of the early efforts of this Association in standardization have been in connection with the preparation of the standard coal contract form in cooperation with the National Coal Association; and the formulation of standard forms of contract for erected and non-erected conveyor equipment in collaboration with the Conveyor Equipment Manufacturers Association.

The Iron and Steel Committee of this Association developed a standard code for marking steel bars, which was adopted by both the Federal Standard Stock Catalogue Board and the Navy Department. This committee also assisted in the development of a standard sales agreement and trade customs for the gray-iron foundry industry.

The Paper Shipping-Container Buyers Group took an active part in

the formulation of specifications for solid fibre containers and for corrugated containers, and the development of standard listings of industrial cotton constructions [illegible] by the Cotton Fabrics Committee.

This Association's Electrical Contract Committee cooperated with several national electrical organizations in the proposed development of standard electrical contract forms for the purchase of electrical machinery.

This Association participates in the activities of the Central Committee on Lumber Standards in the establishment of American lumber standards grading rules for softwood lumber.

Through its own initiative, this Association undertook a simplification program for the reduction of catalogue sizes. This resulted in the adoption of the national standard sizes for catalogues. The Governmental Purchasers Group and the Institutional Buyers Group participated in standardization and simplification programs, either sponsored by or conducted under the auspices of technical organizations or agencies of the Federal Government.

This Association initiated simplification programs in cooperation with the National Bureau of Standards which led to the formulation of several Simplified Practice Recommendations. Specifically, there were established, promulgated, and published by the Bureau Simplified Practice Recommendation R37 covering standard sizes of commercial forms (invoice, purchase order, and inquiry,; Recommendation R58 relating to classification of iron and steel scrap; and revision of Recommendation R166 with reference to color code for marking steel bars.

The Association is represented on sectional committees of the

American Standards Association. It also maintains representation on technical committees of the American Society for Testing Materials.

One of the most useful publications of this Committee is their "Standardization Manual."

NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS[1]

The objects of this association are to promote uniform boiler laws and rules throughout the jurisdiction of its members; to secure uniform approval of specific designs of boilers and other pressure vessels, as well as appurtenances and devices used in connection with their safe operation; and to promote one uniform code of rules, and one standard stamp to be placed upon all boilers and pressure vessels constructed in accordance with the requirements of that code, and one standard of qualifications and examinations for inspectors who are to enforce the requirements of said code.

Whenever it is desired to have the approval of this board on a specific design of a steam boiler, or other pressure vessel, or of any appurtenance or device used in connection with their safe operation, the applicant for such approval shall furnish the secretary of the board copies of blueprints, specifications, or other data. The matter is referred to the standing committee appointed for such purpose, for such action as may be deemed advisable. Upon a report of this committee, the matter is referred to the board.

The approval of such specific design, appurtenance, or device requires the 90 percent affirmative vote of the membership of this board. Upon receipt of approval by this board, the manufacturer of such specific design, appurtenance, or device, shall distinctly stamp same with a four-leaf clover design bearing the initials NBBPVI. No steam boiler or other pressure vessel shall be stamped unless it conforms with the rules formulated by the Boiler Code Committee of the American Society

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[1] Excerpted from Reference 46.

of Mechanical Engineers, and has been inspected during construction and upon completion by an inspector who has been qualified in accordance with the requirements of this Board's by-laws. It shall be applied upon completion of construction only to those boilers or other pressure vessels which are distinctly stamped with the ASME symbol. Any steam boiler or other pressure vessel built after July 1, 1921, and stamped ASME and National Board, may be used within the jurisdiction of any member of this board.

The National Board has the following publications:

PROCEEDINGS. Records the transactions of the General Meeting.

BULLETIN. Issued quarterly for the information and benefit of the members and commissioned inspectors.

NATIONAL BOARD INSPECTION CODE, 1961.

RULES FOR REPAIRS. Recommended rules for repairs by riveting and welding authorized by the National Board (Chapter VI, National Board Inspection Code).

MANUFACTURERS DIRECTORY. List of manufacturers who register objects with the National Board.

NATIONAL BOARD BOILER BLOWOFF EQUIPMENT.

RELIEVING CAPACITIES OF SAFETY AND RELIEF VALVES.

NATIONAL COMMITTEE ON RADIATION PROTECTION[1] AND MEASUREMENTS

This organization, under a slightly different name, was established in the United States in 1929 since which time it has provided the basic standards and guidance in its field. Through the cooperation of many other organizations, its program and accomplishments have proven effective, timely, and of far-reaching importance. Moreover, through interlocking membership in the International Commission on Radiation Protection, the views of this country are integrated into world views.

The first meeting of the committee was held in 1929 and its first objective was to prepare recommendations on X-ray protection. These were published in 1931 as Handbook 15 of the National Bureau of Standards which became the sponsor of all subsequent publications.

The next effort was directed toward the preparation of recommendations on radium protection and in 1934 such a publication was issued by the sponsor as NBS Handbook 18. Shortly thereafter, the need to revise Handbook 15 became evident and a new revision appeared in 1936 as Handbook 20. It is significant that this handbook contained the first recommendation of a specific permissible exposure level of radiation that could be allowed for occupational exposure. It remained in force for 12 years and was used by the Manhattan District Project in its operations. These two handbooks, as revised, were accepted in this country as the primary guides for protection against X-rays and radiations from radium.

Immediately following World War II, many new protection problems arose with the rapid expansion in the radiation field (protection against

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[1] Excerpted from Reference 46.

neutrons, multimillion volt X-rays, radioactive isotopes, etc.). Accordingly, a more systematic and enlarged organizational framework became necessary in order to consider the many different problem areas. As a result, the overall structure was reconstituted to provide the original Main Committee, plus an Executive Committee, and as many subcommittees as necessary for orderly attention to the many distinct phases to be considered.

The subcommittee structure, as presented hereinafter by number and title, suggests the subjects undertaken.

1. Permissible dose from external sources.
2. Permissible internal dose
3. X-rays up to two million volts
4. Heavy particles (neutrons, protons and heavier)
5. Electrons, gamma rays and X-rays above 2 million volts
6. Handling of radioactive isotopes and fission products
7. Monitoring methods and instruments
8. Waste disposal and decontamination
9. Protection against radiations from Ra, Co^{60}, Cs^{137} encapsulated sources.
10. Regulation of radiation exposure dose
11. Incineration of radioactive waste
12. Electron protection
13. Safe handling of cadavers containing radioactive isotopes
14. Permissible exposure doses under emergency conditions

M-1 Standards and measurement of radioactivity for radiological use

M-2 Standards and measurement of radiological exposure dose

M-3 Standards and measurement of absorbed radiation dose

M-4 Relative biological effectiveness

The NCRP activities of the ICRU have resulted in the issuance by the National Bureau of Standards of the following current handbooks:

H42 Safe handling of radioactive isotopes

H48 Control and removal of radioactive contamination in laboratories

H49 Recommendations for waste disposal of phosphorus-32 and iodine-131 for medical users

H51 Radiological monitoring methods and instruments

H53 Recommendations for the disposal of carbon-14 wastes

H54 Protection against radiations from radium, cobalt-60 and cesium-137

H55 Protection against betatron-synchrotron radiations up to 100 million electron volts

H56 Safe handling of cadavers containing radioactive isotopes

H58 Radioactive-waste disposal in the ocean

H59 Permissible dose from external sources of ionizing radiation

H60 X-ray protection

H61 Regulation of radiation exposure by legislative means

H63 Protection against neutron radiation up to 30 million electron volts

H64 Design of free-air ionization chambers

H65 Safe handling of bodies containing radioactive isotopes

H66 Safe design and use of industrial beta-ray sources

H67 Checking prepackaged commodities

H68 Tabulation of data on receiving tubes

H69 Maximum permissible body burdens and maximum permissible concentrations of radionuclides in air and in water for occupational exposure

Other handbooks are in various stages of development.

Note: Handbooks not listed above, are either superseded editions, or they concern subjects other than radiation protection. All handbooks are available by purchase from the Superintendent of Documents, Government Printing Office, Washington 25, D.C.

NATIONAL INSTITUTE OF GOVERNMENTAL PURCHASING[1]

The Institute is an organization of governmental buying agencies of the United States, Alaska, Canada and Puerto Rico. Its membership includes purchasing agencies of states, counties, cities, boards of education and special authorities and districts. The Institute is chartered as a nonprofit educational and technical organization. It is dedicated to the improvement of public purchasing through the interchange of technical and professional information and ideas. Founded in 1944, it is now engaged in its fourteenth year of service to the public purchasing profession.

Its aims and objectives are to: study, discuss and recommend improvements in governmental purchasing; interchange ideas and experiences and obtain expert advice on local, state and national governmental purchasing problems; collect and distribute to governmental purchasing officials information on the organization and administration of governmental buying; develop and promote simplified standards and specifications for governmental buying; promote uniform purchasing laws and procedures; work for or against proposals affecting the welfare of governmental buying agencies; give to taxpayers information on governmental buying problems in order to foster interest in public affairs and cooperation between governmental buyers and those they serve.

NIGP has had a continuing interest in standardization. At its inception the Institute established a specifications library which has grown to more than 10,000 specifications currently in use by the Federal Government and state and local governments. The acquisition of new

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[1] Excerpted from Reference 46.

specifications is announced each month in the official journal.

Several years ago the Institute established a committee on standards and tests for the purpose of developing its own series of recommended specifications. The first in this series has been issued and NIGP plans to issue six such specifications annually. It will expand its work in the field of standardization as rapidly as funds and facilities can be found to carry forward this important work.

PIPE FABRICATION INSTITUTE[1]

The origin of this Institute dates back to 1913.

It was formed for the purpose of establishing a national code for pressure piping. In 1916 this Institute, (then known as the Power Piping Society), developed and published the first standard specifications for power piping.

Fifteen members comprise the membership.

Finances are through dues assessments based on business volume.

Organizational structure. A Steering Committee of seven members which is made up of Board Chairman, Vice Board Chairman, Treasurer, and four members. Board of Directors is composed of all members who do a full range of pipe fabrication.

Main functions are in the areas of engineering, metallurgical, welding and inspection aspects of pipe fabrication.

The activities of this Institute in the field of standardization are carried on in cooperation with the American Standards Association, the American Society of Mechanical Engineers, the American Society for Testing Materials, and other technical engineering bodies. Through its members, this Institute is officially represented on technical committees of the organizations mentioned above. The Institute has adopted standard specifications for power piping recommended as minimum requirements for safe, economical, and commercial installations. These specifications have been prepared as a guide for framing actual specifications for an installation job, and cover the conditions ordinarily encountered in powerplant piping.

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[1] Excerpted from a private communication of N. F. Young, Executive Secretary of the Institute, and from Reference 46.

Standards emanate through the Engineering Standards Committee and Metallurgical Standards Committee. Collective experience is the prime mover in establishment of the Standards.

Standards are advisory, but are accepted as the best practices in the industry. Distribution is world-wide and used extensively by consulting engineers, engineering consulting firms, and by a majority of individuals interested in design, specifying and purchasing capacities.

The Institute has issued to date 14 Standards and 2 Technical Bulletins.

SHIPBUILDERS COUNCIL OF AMERICA[1]

The Shipbuilders Council of America is an unincorporated non-profit national trade association composed of companies engaged in the construction and repair of vessels and other marine craft and in the manufacture of all types of propelling machinery, boilers, marine auxiliaries, marine equipment and marine supplies.

The objectives of the Council are twofold: to keep its members currently advised of all legislative, Governmental, judicial, industrial, and economic developments affecting Maritime Industry; and to present the collective view of its members relating to the

(1) promotion and maintenance of a sound private Shipbuilding and Ship Repairing Industry in the United States;

(2) improvement of the conditions under which the operations of the Industry are carried on;

(3) conservation and development of the Industry as the indispensable corollary to the maintenance of an adequate American Merchant Marine;

(4) development and maintenance of an adequate mobilization potential of shipbuilding and ship repairing facilities, organizations and skilled personnel for availability in time of national emergency; and

(5) establishment and maintenance of active cooperation by shipbuilders, ship repairers, and allied industries with such other persons, groups, corporations, and associations as may have a joint interest in the attainment of the foregoing objectives.

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[1] Excerpted from the Annual Report, Shipbuilders Council of America, April 1, 1961, and from Reference 46.

Since its reorganization along its present lines some 30 years ago, the Shipbuilders Council has included in its membership practically all of the leading companies in the United States operating shipyard and dry dock facilities and the industries closely allied to such activities.

The Shipbuilders Council conducts a continuous program to promote a comprehensive understanding of the operations and the problems of the Industry by the Government, both legislative and executive, by business men, by educators, by journalists and by the public generally, to the end that this understanding may be appropriately applied in the solution of the problems of promotion and regulation which arise because of the vital role played by the Industry in the national economic welfare and in the national security of the country.

To further these various ends, the Shipbuilders Council publishes bulletins, briefs, pamphlets and reports, including a comprehensive bulletin service for its members on current developments in the Industry and on its relations with Government. These concern such matters as legislation affecting maritime industry, types and provisions of government contracts, renegotiation regulations, profit limitations, taxation, defense mobilization requirements, material and labor controls and regulations, price controls, insurance, judicial decisions, government organization, industrial liability, foreign trade and the economics of the Industry. Accurate statistical data relating to shipbuilding and ship repair not available from other sources are prepared and maintained by the Council for use before legislative, executive and regulatory bodies

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[1] Excerpted from the Annual Report, Shipbuilders Council of America, April 1, 1961, and from Reference 46.

and for distribution among its members.

Although this organization does not deal directly in standardization problems, it has through its board of directors organized a technical committee whose purpose is to keep in touch with technical developments in the shipbuilding and allied industries. It also maintains a Committee on Standard Contracts and Forms to study contracts and forms of contracts for the purpose of obtaining reasonable uniformity in both Government and private contracts.

The Shipbuilders Council has pioneered in the promotion of sound planning to provide maximum assurance that there will be available in the United States at all times efficient and reasonably adequate privately owned facilities for shipbuilding and ship repairing.

SOCIETY OF AUTOMOTIVE ENGINEERS[1]

A. Purpose and Objectives

Through the years, the SAE has been the professional society of the automotive industry. Today it is an organization of some 24,000 members--an organization wherein leading engineers and those just gaining a foothold in the industry meet on common ground to exchange information on new developments in automotive transportation.

The Society's objectives are the development, collection, and distribution of technical information. SAE serves its members through meetings and programs developed by its various Engineering Activities and Sections, through Placement Committee, and through its publications; it serves industry and government through the development of standards, recommended practices, and information reports by its technical committees.

B. Engineering Activities

SAE Engineering activities are in the following areas, with provision for expansion to related fields as suggested by member interest:

Air Transport
Aerospacecraft
Aerospace Powerplant
Body
Computers
Engineering Education
Engineering Materials
Farm, Construction & Industrial Machinery
Fuels and Lubricants

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[1] Excerpted from "SAE Technical Committee Guideposts," "Aims and Activities of SAE and the Privileges of SAE Membership," SAE, and from Reference 46.

Passenger Car

Powerplant

Production

Science-Engineering

Transportation and Maintenance

Truck and Bus

C. Technical Board

The SAE Technical Board is the nerve center of the Society's vast technical committee program.

Members of the Technical Board are leading engineers from all parts of the ground and flight vehicle industries. These exceptionally qualified men are responsive to the many industrial needs for SAE activity. Through the Technical Board they give direction to and coordinate the technical committee and research projects which serve the ground and flight fields with engineering standards, recommended practices, and reports.

SAE cooperative research on the utilization of fuels and lubricants in automotive apparatus is conducted through the Coordinating Research Council. This Council is supported jointly by SAE and the American Petroleum Institute.

Published reports resulting from accomplishments within the Society's technical program are made available to all members, the industry and government. Summaries of these reports appear regularly in the news features of the SAE Journal.

D. Standardization Activities

Standardization has been an important activity of this Society from

its very beginning. It now carries on technical standardization work for the motor vehicle, aircraft, airline, space vehicles, farm tractor, earth-moving, and roadbuilding machinery, and other manufacturing industries using internal combustion engines. With the exception of standards for the aeronautical industry, which are published in loose-leaf form, the standards of the Society are published annually in the SAE Handbook. The Society's standardization work is under the general direction of the SAE Technical Board which organizes such technical committees as may be necessary to carry on the work. Most of these technical committees are of a permanent nature, but some are appointed to handle specific projects and are disbanded upon their completion. The Society's standards and technical committee activities also include active advisory cooperation with the Armed Forces and numerous other Federal and State government agencies.

The SAE standardization activity began in 1902 with the adoption of standards by the National Association of Automobile Manufacturers that was organized in 1900. In 1903, the Association of Licensed Automobile Manufacturers was organized by manufacturers licensed under the Selden patent. In 1910 the Society took over from the Mechanical Branch of the AIAM its work of preparing technical data and appointed the first Standards Committee in the automotive industry. During the years immediately following, other industries began to use internal combustion engines more widely, and it became evident that the SAE was the logical body in which to centralize all such activities. In 1917 the American Society of Aeronautics Engineers and the Society of Tractor Engineers merged with the SAE and soon thereafter the National Association of Engine and Boat

Manufacturers and the National Gas Engine Association merged their engineering and standardization work in the SAE, and the Society of Automobile Engineers then became the Society of Automotive Engineers, Inc. In 1926 the Society initiated standardization in automotive production engineering, and in 1931 adopted the first standardization in the motor transport field.

In cooperation with the American Petroleum Institute, the SAE sustains the Coordinating Research Council. This Council was set up in 1942 to conduct cooperative research, standardization, and similar work aimed at mating fuels and lubricants to their power plants.

All standards, specifications, and reports developed by the Society are made available for industry and Government use on a voluntary basis. Frequent checks are made to determine use of each document. Unused documents are canceled. The SAE has been important in aiding Government agencies, both civil and defense, in the development of sound technical documents. SAE standards are recognized in Government publications as sources for establishing minimum technical requirements in areas where Government regulatory control has been established.

E. Technical Publications

SAE JOURNAL is the monthly technical publication of the Society. It contains up-to-date articles based on information drawn from papers, reports, and other technical material developed by SAE Activity and Technical Committees.

SAE TRANSACTIONS, a yearly publication, contains individual National and Section meeting papers selected for their reference value. Anonymous Reader's Committees composed of specialists in the various fields select the papers to be included in this publication.

ADVANCES IN ENGINEERING SERIES--Books in this NEW Series are symposia of papers on specific subjects designed for information having a probable useful life of five years or more.

TECHNICAL PROGRESS SERIES--These NEW Series books are symposia of papers on specific subjects designed for information having a probable useful life of two years or more.

TECHNICAL PAPERS presented before the Society are available at nominal costs.

SPECIAL PUBLICATIONS are booklets on specific ground vehicle standards, Journal articles, or special reports for which there is an immediately expressed need. Lists of titles and prices may be secured from SAE Headquarters.

SAE HANDBOOK, issued annually, includes all current ground vehicle standards approved by the Society. It represents the cumulative work of 200-plus Technical Committees operating under the SAE Technical Board. The information amassed by these Committees is used by industry to design and produce its products more economically and efficiently.

AEROSPACE reports emanating from the Technical Board are released in loose-leaf form. These include: SAE Aerospace Material Specifications (AMS), SAE Aerospace Standards (AS), and Recommended Practices (ARP), SAE Drafting Standards and SAE Aerospace Information Reports (AIR).

SOCIETY OF NAVAL ARCHITECTS AND MARINE ENGINEERS (SNAME)[1]

A. Objects

The objects of this Society are:

1. To advance the art, science and practice of naval architecture, shipbuilding and marine engineering, commercial and governmental, in all of their branches and of the allied arts and sciences and to promote the professional integrity of its members.

2. To afford facilities for exchange of information and ideas among its members; to place on record the results of research, experience and information relative to original design and improved methods of construction of vessels, their machinery and equipment.

3. To maintain and improve the status of naval architects and marine engineers and others of its members, and to afford facilities for their advancement in the knowledge of their profession.

4. To cooperate with universities and other educational institutions and public educational authorities for the furtherance of education in naval architecture, shipbuilding and marine engineering, and in allied arts and sciences.

5. To encourage and sponsor such experimental and other inquiries as may be considered important to the promotion of the art and science of naval architecture, shipbuilding and marine engineering and of allied arts and sciences.

6. To investigate inventions and problems of special interest to the profession.

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[1] Excerpted from a private communication of M. H. Gluntz, Captain, USN (Ret.), Administrative Assistant, Society of Naval Architects and Marine Engineers, and from "General Information Book", SNAME, and from Reference 46.

B. Standardization Work

1. Society's Codes. The Technical and Research organization is the organization within the Society that prepares and issues codes.

The Technical and Research organization is composed of a Steering Committee (policy and overall direction) and four major committees, as follows:

(a) Hydrodynamics
(b) Hull Structure
(c) Ships' Machinery
(d) Ship Technical Operations

and some 25 or more panels.

Codes are normally prepared by the cognizant panel, approved by the major committee, and published by the cognizant panel on behalf of the Society. Revisions are undertaken by the cognizant panel.

Some of the most important of these Codes are:

Standardization Trials Code. October, 1949.

Economy and Endurance Trials Code. December, 1952.

Code on Maneuvering and Special Trials and Tests. July, 1950.

Code on Instruments and Apparatus for Ship Trials. Oct., 1952.

Code on Installation and Shop Tests. November, 1960.

Standard Lifeboat Code. June, 1961.

A complete list of Bulletins, Codes, and Data Sheets prepared by the Technical and Research Committees appears in: "Publications of the Technical and Research Committees," SNAME.

2. Participation in the Standardization Movement. This Society takes an active part in the standardization movement in cooperation with other interested organizations. Through representation on sectional committees functioning under the procedure of the American Standards

Association, it cooperates in the development of standards covering the following projects: Standardization of gears; pipe flanges and fittings; bolt, nut, and rivet proportions; code for pressure piping; classification and designation of surface qualities; ventilation code; standards for drawings and drafting room practice (exclusive of architectural drawings); mechanical refrigeration installations on shipboard; safety code for forging and hot metal forming; terminology for automatic controls; and reactor hazards.

C. Other Publications

1. Text Books:
    a. Principles of Naval Architecture (a two-volume set)
    b. Marine Engineering
    c. Historical Transactions, 1893-1943
    d. The Shipbuilding Business in the United States of America (a two-volume set)
    e. Design and Construction of Steel Merchant Ships
    f. Hydrodynamics in Ship Design (a two-volume set)
2. Others:

    Journal of Ship Research

    Transactions

    Technical Papers

SOCIETY FOR NONDESTRUCTIVE TESTING (SNT)[1]

This Society was formed in August, 1941, under the name of "American Industrial Radium and X-Ray Society," by a group of men working in the field of industrial radiography.

A portion of the approved history of the society states: "Mr. Philip D. Johnson was the organizer and leader of the group and became the first National Secretary of the Society. Subsequently the association spread rapidly throughout the United States by creation of local sections serving distinct industrial areas. With the introduction of new methods for nondestructive testing supplementing the older methods, it became increasingly evident that the name of the Society should reflect this changing pattern. Accordingly, in 1947, the Society became officially known as "Society for Nondestructive Testing, Incorporated."

In 1960 therewere 36 sections and about 3,500 members in the SNT.

The Society is devoted to education and research in the field of techniques in nondestructive testing of materials, employing radiography, ultrasonics, magnetic particle, gaging, eddy currents and other electrical tests, pressure, proof loading, etc.

It holds section meetings regularly together with regional conventions annually. It also convenes a national annual meeting each year.

The bimonthly journal, "Nondestructive Testing," is published by the Society.

The Ronald Press Company has prepared under the auspices of the Society for Nondestructive Testing the "Nondestructive Testing Handbook."

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[1] Excerpted from the "Manual for Operating SNT Sections," SNT, and from Reference 46.

The Handbook explains and illustrates the use of qualitative and quantitative tests which may be applied at any or all stages of production--demonstrates mechanization and automation of test methods, in-service testing of essential equipment. Practical examples point up typical situations in which NDT inspections eliminate expensive production rejects, warn of critical parts fatigue, make possible the utilization of new and improved engineering materials.

STANDARDS ENGINEERS SOCIETY (SES)[1]

A. Origin

The Standards Engineers Society was organized in 1947 and was incorporated in 1956. The Society is now an international organization with local sections in the United States, Canada and the United Kingdom. Additional sections are in process of formation in Sweden and others in the United States.

B. Objects

The objects of the Society, consistent with its incorporation as a professional, non-profit organization, are to insure benefits to its members and to the general public through appropriate scientific, literary and educational activities, and specifically:

a. To provide means by which standards engineers and others interested in standardization may, in meetings, publications of the Society, and in other media, discuss the principles, techniques, effects, and other professional aspects of standardization.

b. To further standardization as a means of enhancing general welfare.

c. To promote knowledge and use of approved standards issued by regularly constituted standardizing bodies, but expressly excluding the development or issuance of standards by the Society.

d. To encourage, through suitable awards, scholarships and grants, significant additions to the literature of standardization and its formal study, including research, in appropriate institutions of learning.

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[1] Abstracted from private communications of Arnold M. Rosenwald, Director, Boston Section, SES; from the article "The Aims and Objectives of SES", Harold R. Terhune, President, SES; and from the brochure "Why Membership in SES", SES.

e. To maintain a high professional standing among, and professional criteria for, standards engineers.

C. Members

SES currently has about 1200 members. All are individual members, unlike many other organizations such as ASA, which accepts membership from companies and trade associations. All members are individuals active in or interested in the field of standardization, either as working standards engineers, procurement people, economists, manufacturing people, students, and executives or administrators of industrial or educational organizations.

D. Finances

SES is financed solely by membership fees and income from advertisements contained in the Annual Meeting souvenir booklet and also the Yearbook. The Society is about to accept advertising in its monthly publication called "STANDARDS ENGINEERING."

E. Organization

Organizationally the Society is arranged in local sections, each of which operates independently but within the general framework of the constitution and bylaws of the Society. There are eighteen local sections at this time.

F. Activities

The Society provides a forum for the exchange of technical information among its members at regularly scheduled sectional meetings and annual national meetings.

G. Publications

"STANDARDS ENGINEERING" is a magazine published monthly by the

Society devoted to articles that discuss the principles of standardization and experiences of standards engineers in putting them into effect. It also reports on the activities of the Society and its members. The magazine is part of the Society's services to its members, but is also available on subscription.

The PROCEEDINGS of each annual meeting are published by the Society and constitute a valuable reference to current thinking on standardization problems.

The Society has under development a "Standards Engineer's Handbook" which should provide standardization information, more specifically, data on administrative organization within which to engage in standardization, manpower and budget requirement and breadth of activity of such an organization; actually all this information is not readily available and this Handbook will satisfy a real need.

STEEL FOUNDERS' SOCIETY OF AMERICA[1]

A. Origin

The origin of Steel Founders' Society dates to 1902. The Society was created as a luncheon club by a number of steel foundrymen in the New York area, and by 1907 it had grown to a national organization with a board of directors. The Society was incorporated under the laws of the State of New York for awhile. It is now an incorporated association.

B. Purposes

The purpose of the Society is to promote the general welfare of all engaged in, or affected by the manufacture and sale of steel castings, and specifically:

1. To stimulate the growth of the industry through the expansion of its possibilities, and to secure a wider market of its products.

2. To secure improvement in the production of work; to conduct technical, business and market research; to maintain a high standard of product, and to secure and exchange among members such information regarding products, conditions of production, and requirements of consumers as will tend to reduce the cost of manufacture, improve the product, eliminate waste and expensive duplication of effort, etc., thus rendering a better service to the ultimate purchaser and the public.

3. To promote, through publicity, a better understanding on the part of the purchasers of steel castings as to those differences in process, service and manufacture that cause differences in price; to

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[1] Excerpted from a private communication of Erwin Dieckmann, Secretary of the Society, and from "Members of Steel Founders' Society of America Listed by States," Steel Founders' Society of America.

secure, through publicity, a better knowledge of the advantages gained through the use of steel castings, thus assisting the industry to expand.

C. Membership

The Society membership numbers 120 members and 132 operating plants mostly in the United States and Canada.

D. Finances

Society expenses are financed by assessing dues based on sales by the various members.

E. Standardization Activities

The Society has a Specifications Committee for the preparation of raw materials specifications and minimum standards specifications. This committee is made up of engineers from among the member companies.

Some of their standards publications are:

1. Recommended Minimum Standards for Commercial Carbon Steel Castings.
2. Summary of Standards Specifications for Steel Castings.
3. Raw Materials Specifications:
    a. Gelatinized Cereal Binder
    b. Zircon Sand and Flour
    c. Washed and Dried Sand
    d. Western Bentonite
    e. Crude Sand
    f. Cast Steel Abrasives
    g. Malleable Iron Abrasives

The Society is represented on specification committees of other organizations and cooperates particularly with technical committees of

the American Society for Testing Materials in the development of standards and methods of test for steel and steel castings, metallography, radiographic and magnetic particle testing, and other matters of interest.

F. Other Publications

A list of the rest of the technical publications of the Society appears in: "Literature currently available from Steel Founders' Society of America."

ARGENTINA

Instituto Argentino de Racionalizacion de Materiales (IRAM)[1]

A. Origin

The principal reason for the founding of the Argentinian Institute for the Standardization of Materials (Instituto Argentino de Racionalizacion de Materiales - IRAM) in 1935 was the necessity of having standards on which the State could rely in acquiring materials needed for its own development, as there were practical difficulties and problems due to the differing origins of the industries there.

B. Creation

Because of these circumstances, State and industrial institutions, technical bodies and study centers decided to found the IRAM Institute. From the beginning, it was exclusively private in nature. In all its activities, it has made it a principle to bring together for the study of a standard all the interests able to take part.

C. Members: Nature and Number

The Institute members fall into six categories: founding, honorary, active, individual, corresponding and associate.

1. Founding members are those who appear as such in the enabling act, as well as titular members and the Management Council deputies elected by the Assembly on 15 April, 1937. They pay no fees.

2. Honorary members are those persons who, because of their recognized experience in subjects touching on IRAM's concerns, and because of the collaboration they have given it, have well earned this title, which is proposed by the

[1] From reference 42.

Management Council or is requested by at least 10 percent of the members with voting rights, and is accepted by the Assembly. They pay no fees and can be consulted individually or collectively, the Management Council being able to form an honorary consultative body to this end.

3. Active members are the official institutions, the corporations, the technical, scientific, industrial or commercial organizations, establishments of public or private education, libraries and related organizations. They are represented by one general delegate and pay a fee fixed by the statutes. Active members join as candidates and stay in this category during the first two years of their association, afterwards acceding to the category of active members. They pay such dues as are fixed by decision.

4. Individual members are university-trained professionals or persons qualifying through experience considered to be sufficient by the Management Council. They pay such dues as are fixed by decision.

5. Corresponding members are persons residing abroad and appointed by the Assembly, after being proposed by the Management Council, for the creation or the maintenance of contacts with the country of residence and its organizations. These members are exempted from any payment of fees.

6. Associate members are technology or university students. They pay such fees as are fixed by decision. Those who acquire

university degrees are taken into the category of individual members.

D. Finances

The Institute's financial resources are derived from the following:

1. entrance fees, members periodical contributions and fixed dues;

2. donations, allotments, grants, contributions, subsidies or legacies;

3. personal and real estate belonging to the Institution;

4. income from property, securities, bonds or from any other kind of capital it possesses;

5. fees received for expert appraisements, quality checks or for the right to use the Seal of Conformity with IRAM standards;

6. special contributions of official or private organizations, ear-marked for the study of special series of standards;

7. any other source it can tap which may contribute to the furtherance of its aims.

E. Staff

The Institute has at its disposal a stable technical and administrative staff which has permitted it to develop much more rapidly than its financial resources would presuppose.

F. Functioning

In conformity with its registered articles, the Institute's administration is handled by a Management Council, a body having

voting rights. This Council can be renewed annually to the extent of one-third of its members, but there are no limits to the number of times a member may be re-elected.

The technical section is at present grouped into teams for related subjects. Each team, which is called within the organization an "A Team", is directly under a chief, who must be a university-trained professional, and is made up of technicians responsible for the functioning of a committee and its appropriate assistants.

The head of each "A Team" has the following responsibilities:

1. to direct and supervise the actions of the groups for which he is responsible;

2. to direct technicians in charge of groups which are connected with his team;

3. to direct and teach standardization principles to auxiliary personnel;

4. to submit the working plan to the General Management;

5. to work with the study groups when there is a communication from the "A Team" on a standard whenever the need is felt;

6. to evaluate the personnel directly responsible to him, by making proposals to the General Management.

The technician in charge of groups must:

1. Prepare the standards which correspond to his groups;

2. direct the work of sub-committees or of the specialized commissions for which he is responsible;

3. acquaint the team chief with the working plans for the groups under his charge.

The duties of the auxiliary technical personnel are the following:

1. to work with the technician in the research and classification of prior material;

2. to prepare a standards outline, if his immediate superior authorizes it;

3. to work with his direct chief on the meetings and to prepare the pertinent documents;

4. to read the documents, standards, etc., which are connected with his work;

5. to keep archives on all documentation.

When different "A Teams" exist whose members must all have similarly-based knowledge, a "B Team" is made up for co-ordination, which operates in practice as a specialized department.

The structure of the technical department at present is the following:

Team A-1	(Metallurgy	(
		(
	(Mechanics	(
	(Fire-fighting material	(
	(Water-mains	(
	(Self-propelling vehicles	(Team B-1
Team A-1'	(Agricultural machines	(
	(Safety materials	(
	(Packaging	(
	(Highway machines	(

	(Electrotechnics	(	
	(Telecommunications	(	
Team A-2	(Self-propelling vehicles	(	
	((electricity section	(	
	(Aeronautics (electricity section	(	Team B-2
		(	
	(Unification of nomenclature and	(	
Team A-2'	(of symbols	(	
	(Quality checking	(	
Team A-3	(Pest-control products	(	
	(Manure	(	
Food and tech	(Food	(	
nological	(Rubber	(	
products of	(Plastics	(	
agriculture	(Leathers	(	
and stock-	(Oils and fats	(	
farming	(Surface active agents	(	
	(Analyses of metal substances	(	
		(	Team B-3
	(Oil	(	
	(Dyes	(	
Team A-4	(Chemical industry products	(	
	(Mining products	(	
Industrial	(Precious metals	(	
products	(Office equipment	(	
	(Textiles	(	
	(Photographic material	(	
	(Solid fuels	(	
	(Medical and laboratory instruments	(	
	(Binding materials	(	
Team A-5	(Mortars and cements	(	
	(Aggregates	(	
Construction,	(Refractary, ceramic and glass	(	
refractory	(materials	(	
and glass	(Wood	(	
materials	(Water-proofing substances	(	
		(	
	(Structural calculation	(	Team B-4
	(Framework	(	
Team A-6	(Sanitary installations	(	
	(Tiling	(	
Building,	(Elevators (Lifts)	(	
flooring	(Prefabricated elements	(	
	(Flooring	(	
	(Acoustic materials	(	

The forming of teams is not yet completed because of an insufficient number of technicians. But this work inside the organization would permit us to be certain that the shaping-up of a given draft corresponds to the country's technical and economic realities. This is why study groups representing all the sectors in question are being added. A description of their functions follows:

1. Sub-Committees. The sub-committee work is similar to that of any collegial assembly in that it is possible for each representative to express his opinion on the proposed standard and to indicate at any moment those modifications which he deems necessary.

IRAM's permanent technician acts as technical secretary. In each case, he points out reasons which have determined the adoption of a value, a definition or a process, and looks for similar data in past standards or in other countries' experiments that may forestall long sterile discussions apt to arise in disputed cases.

This system of work, in which the consumer, the producer, the merchant and the technician share equally in the work through representatives on the permanent staff and through delegates from organizations such as the Argentine Engineers' Center, the Argentine Chemical Association, study centres, etc., serves to guarantee that the standard will fit the actual possibilities of the country's techniques and that it cannot be suspected of favouring certain solutions or tendencies.

2. Committee. The activity of the specialized committee is limited to technical aspects; its principal function consists in preventing standards of the same specialization from having different test methods, definitions, etc.

3. General Standards Committee. On several occasions, the opinion has been expressed that this body has functions very similar to those of the specialized committee and that in consequence studies of certain parts of a standard are uselessly repeated.

This opinion is not, however, justified, for the members of the General Standards Committee examine the standard as if they had to use it themselves and, not having had a hand in its study, they can freely criticize and judge whether the conditions set out are clear, and whether the standard's application presents any difficulties.

G. Methods Used for Drafting Standards

Once the study groups and the General Management have approved the work projects, the permanent technicians begin preparing the standards, keeping in mind all data concerning the needs of the country and the Institution's economic possibilities.

The full study of a standard is made up of different stages, each one having several phases:

1. Collecting of data pertinent to the matter
2. Preparation of an outline
3. Examination by the sub-committee concerned
4. Examination by the responsible "A Team"

5. Public discussion

6. Compilation and classification of comments by the "A Team" and presentation to the sub-committee

7. Examination by the sub-committee

8. Examination of the standard and drafting of a report by the co-ordinating "B Team"

9. Examination of the standard by the committee

10. Examination by the General Standardization Committee

11. Approval and report of the General Standardization Committee

12. Examination and approval by the Management Council

13. Presentation to the Consultative Standardization Commission (CSC)

14. Examination of comments received by the SCS

15. Communication from the "B Team"

16. Consultation of the study commission

17. New approval by the Management Council

18. New presentation to the CSC for continuation of the process.

When it has been decided to study a standard, the Institute's permanent technical personnel studies all known national and foreign data on the subject. After detailed study thereof and a thorough technical analysis, it prepares an outline which it submits for study to the sub-committee or to the Specialized Commission, composed of all representatives directly concerned with the matter from the technical and economic point of view.

The sub-committee or the Specialized Commission examines the standard outline point by point, checking in particular whether it contains all the elements which specify precisely the characteristics of the matter in question.

After this first study, the standard is subjected, in the form of Outline 1, to public discussion for a minimum period of 45 days and a maximum of 180, set by the organization itself according to the technical and economic importance of the matter.

During the period of public discussion, all bodies and individuals so desiring may express their opinions on the standard, even if they do not belong to the Institution and have not taken part in the preliminary study.

In addition, foreign standards institutes are consulted during the same period.

In all cases, public discussion supplies interesting details, but when the matter under consideration has technical or economic importance, the collaboration thus obtained is quite remarkable; it is also fitting to bring out the contribution of foreign standardization institututes.

After the period of public discussion, the specialized body studies the standard and, at the same time, the comments received, rectifying or ratifying the positive elements or reconsidering other aspects, in accordance with the opinions collected.

As a general rule, the standard approved as a draft proposal is, after this new study, submitted for examination to the Specialized Committee, which analyzes it from the point of view of its application; if it is approved, it is presented to the General Standardization Committee.

As has already been said, the specific function of this committee consists of co-ordinating the work of the specialized committees and giving uniformity to the different standards studied by IRAM, as far as is technically possible. This body, therefore, studies the standard from that point of view, devoting special attention to editing and lay-out.

Once the standard is accepted by the General Standardization Committee, it is submitted to the Management Council which, by its approval, transforms it into an IRAM standard. Thus the circuit is completed within the Institute.

Thereafter, the standard is submitted for examination by the Consultative Standardization Commission, an official body, which submits it for study to the corresponding public services for a period of six months at most. If, during this time, the standard has not been contested, it is published by decree of the Executive Power as an Official IRAM Standard. and becomes thereby compulsory for all purchases made by the national government.

If a standard is contested, however, it comes back to IRAM for reconsideration, and afterwards follows the pattern outlined above.

H. Number of Standards Published

The number of approved standards stands at 1,500 (beginning of 1961).

I. Other Periodical Publications

At the moment, IRAM publishes, besides standards, only the review "Informaciones IRAM", whose main task is to inform those connected with the work as to the essential facts of its progress, including sometimes--and more and more often--technical articles on their own standardization work.

J. Marks Indicating Conformity With Standards

In 1956, the IRAM Institute decided to draw up a system of Seals of Conformity with Standards, the general operation of which is as follows:

The service of the Seal of Conformity with IRAM Standards will consist of:

1. technical committees;
2. a secretariat.

It will be subordinate to IRAM's General Management, and the Management Council can appoint an internal commission if this is deemed necessary to handle the affairs connected with the service.

The technical committees will have the following tasks:

1. To discover whether the product for which the Seal of Conformity with IRAM Standards is sought fulfills the conditions necessary to grant it, and to inform the Management Council thereof

2. to propose to the Management Council the charge to cover this service;

3. to determine the test conditions in the private or official laboratories that IRAM assigns for this service, under IRAM's control.

The secretariat is to have the following duties:

1. to carry out the administrative work that the Seal of Conformity service gives rise to;

2. to open accounts for fees, and keep the corresponding records;

3. to make periodic inspections of the material approved, either in the factories or on the market.

The technical committee will be made up of six titular members, three for each of IRAM's B and C divisions, and of two deputies, one for each division. It is to have a chairman and a vice-chairman responsible to division A and who will be elected by the technical committee from a list of people proposed by the Management Committee. The deputy members and the vice-chairman will sit in for absent titular members.

The members of B and C divisions of the technical committee will serve for three years and are not eligible for re-election. The chairman and the vice-chairman will be elected each year when the technical committees are formed, in conformity with what has been decided.

One third of the B and C division members will be replaced each year.

Each technical committee will prepare the regulations governing the functions incumbent on it, in conformity with the general provisions of the statutes, and will submit same to the Management Council for approval.

When a member of the technical committee is an industrialist or has a commercial interest in the product for which the Seal of Conformity with IRAM Standards is sought, he may not participate in any of the stages leading to its eventual granting.

The technical committees may consult other similar bodies, laboratories, individuals or corporate bodies any time they judge it necessary for the fulfillment of their duties, under the conditions to be fixed by the Management Council.

Here are the general conditions which must be fulfilled in order that the IRAM Seal of Conformity may be affixed to any specific material or product:

1. The material or product must be produced within the country and correspond to the pertinent IRAM standard, approved at least by the Institute's Management Council;

2. The material or product for which the request is made must be obtained in such a way that the means of production and of verification ensure both permanent good quality and the possibility of identifying the manufactured goods with the samples submitted for IRAM approval;

3. The holder must have accepted without reservations the provisions of the regulations set up by the corresponding technical committees;

4. He must also have accepted without reservations the contractual clauses specified by IRAM in the legal instrument of authorization.

In cases where the use of the Seal of Conformity with IRAM Standards is sollicited for foreign materials or products, the Management Council will decide if it is appropriate to increase the charges, after consultation with the appropriate technical committee.

The Seal of Conformity with Standards may be affixed only on material or on products for which it has been requested and granted, and its use excludes the utilization of any other seal or mark having the same goal unless IRAM expressly allows it.

Authorization for using the Seal of Conformity with IRAM Standards cannot be ceded to third parties without the express agreement of the Institute.

The Seal of Conformity with IRAM Standards includes:

1. The service subordinate to IRAM which is entrusted with the formalities necessary for the granting and with the work entailed by the application and affixing of the mark for distinguishing the materials and products fulfilling the conditions of the regulation in question, as well as with the collecting of fees corresponding to the various services;

2. The material representation of this distinguishing mark.

From the point of view of its material form, the Seal of Conformity with IRAM Standards is a mark composed of a seal, a label, a distinctive matrix, etc., and which is affixed or glued to, or included in each unit, group of units, packaging, etc., which it is supposed to distinguish.

The Seal of Conformity to IRAM Standards will be applied to materials and products conforming to the regulations and requirements of the corresponding IRAM standards and will be granted under the conditions fixed by the present regulation.

The service of the Seal of Conformity with IRAM Standards is an exclusive IRAM prerogative; it is untransferable and cannot establish new provisions except in accordance with its statutory authorities.

The lists of materials and products for which the granting of the IRAM Seal of Conformity may be requested will be established by IRAM's technical bodies entrusted with their application.

FRANCE

ASSOCIATION FRANCAISE DE NORMALISATION (AFNOR)[1]

A. Origin

A ministerial decree of 15 June 1918 set up the "Commission Permanente de Standardisation". This Commission did outstanding preparatory work, but being possessed of a purely administrative and public law status, it ran into obstacles and misunderstandings, and it finally had to break off its work for lack of funds.

B. Creation

The Association Francaise de Normalisation (AFNOR) was founded in 1926 to fill the gap left by the Permanent Standardization Commission. From the start, AFNOR enjoyed the status of a private association. It has always retained this status, to which was added by decree of 5 March 1943 that of being a public service.

C. Members: Nature and Number

AFNOR has now around 7,800 supporting members: producers, distributors, consumers, public administrations, scientific organizations, etc.

D. Finances

The funds of AFNOR derive partly from the public authorities and partly from the sales of standards and the dues of its members.

[1] From reference 42.

E. Staff

In a total staff of about 210 persons, AFNOR has 57 engineers and the like.

F. Functioning

Having experienced the handicaps resulting from the purely administrative status of the Permanent Standardization Commission and the purely private activity of AFNOR between 1926 and 1928, the organic structure of AFNOR was several times modified between 1928 and 1941. This progressive shaping up is based on coordinating the three possible sources of initiative in the matter of standards:

- public authority
- specialized national institutions
- organizations of professionals or consumers,

it being understood that individual initiative is found in all three categories.

The law of 24 May 1941 and later texts design the qualified French organizations, fix their respective tasks, and set up the procedures by which their activities are coordinated.

1. Commissariat for Standardization

The Commissioner for Standardization is administratively attached to the Ministry of Industry. His is the role of an interministerial functionary delegated by the two ministries responsible for standardization work in France: the Ministry of Industry, and the Ministry of Agriculture.

These two ministries are empowered:

- to give general directives to standardization bodies;
- to draw up, hold to schedule, and push the execution of the national standardization program;
- to see to it that the prescribed procedures for developing standards are observed;
- to ratify the standards;
- to fix the conditions under which the standards are to be applied.

Ratification is accorded on proposal of the Commissioner for Standardization on presentation of report drawn up by AFNOR.

The list of standards ratified each month is published in the Official Journal of the French Republic in the form of a decree.

2. French Standardization Association

As standardization is considered a public service in France, this association has had conferred upon it by governmental authority some fairly definite prerogatives, which the decree of 24 May 1941 specifies as follows:

- it centralizes and coordinates, under the authority and supervision of the Commissioner for Standardization, all work and studies concerning standardization.
- It transmits to standardization bureaux the directives received; it aids them to develop drafts of standards assigned

to them; it verifies, in conditions specified in item 8.3 below (public enquiry), the drafts drawn up by them and submits same to ministerial ratification.

- In the absence of a qualified standardization bureau, it sets up technical commissions assigned to draw up draft standards.

- More generally, it coordinates all activities tending to develop standardization and acts as intermediary between them and the public authorities.

- It represents France in connection with foreign bodies and in international meetings concerning standardization; it is the French centre for documentation of foreign standards.

- Finally, it functions generally for publication, information, and publicity with respect to everything concerning standardization.

3. The Standardization Bureaux

The first official definition of the role of the standardization bureaux is found in a ministerial order of 26 November 1928: "The standardization bureaux are the technical agents for the drawing up of standards". This definition recurs in later texts. Article 7 of the decree of 24 May 1941 specifies the conditions to be met for an organization to become officially approved as a "standardization bureau".

The juridical status of the standardization bureaux is variable, each being linked in a working association with

G. Method Used for Drafting Standards

The procedure for setting up French standards may be schematized as follows:

1. Preparatory technical work

- The programming of standardization work on a suggestion which the Commissioner for Standardization recognizes as valuable.

- The preparation of a basic document by a qualified chairman or organization.

2. Preparation of draft standard

- Examination of the preparatory document by a commission containing representatives of producers, consumers, distributors, public administrations, scientific and technical bodies, and qualified individuals.

- Extensive technical studies, which may involve laboratory research, practical testing, adjustment to pre-existing standards, comparison with foreign standards, etc.

- The perfecting of a draft standard provisionally accepted by the Commission and by AFNOR.

3. Public inquiry by AFNOR and shaping of final text

- AFNOR sends out the draft standard to establishments, organizations or individuals wishing to participate in the inquiry.

- Press relations.

- Dispatch to foreign country members of the International Organization for Standardization (ISO).

- Examination by the standardization commission of AFNOR of each of the replies to the inquiry, in which their authors may join the discussion.

- Editing of the final text.

4. Ratification

- The extablishment by AFNOR of a ratification presentation report (in which particular mention is made of comments not accepted).

- Check by the Commissioner for Standardization to see that there is no opposition on the part of any directly interested ministerial departments.

- The signing by the proper minister of the ratification decree, published in the Official Journal.

5. Printing, publishing, application and later evolution of the standard.

- Varied methods of application, from the most diverse forms of propaganda and persuasion to certain instances of the public authority taking over.

- The systematic amelioration of the standard where technique is in process of evolution.

H. Nature of Standards

The standard is a document measuring 21 cm x 27 cm, which may be a single sheet or a booklet of more than a hundred pages.

The uniform presentation of the first page corresponds to that found in most foreign standards.

The dissemination of standards is handled by AFNOR and, where necessary, by the standardization bureaux.

Legally, the status of the French standard is mainly given in the following provisions:

1. The Order in Council of 13 November 1938 and the decree of 24 May 1941 on standardization, confirmed in respect to contracts made in the name of the State by the decree No. 56 256 of 13 March 1956, prescribe that: "The introduction of ratified standards or the explicit mention of their application is obligatory in the clauses, specifications and articles and conditions of contracts entered into by the State, the departments, the municipalities, public concessions and State-aided enterprises".

The purport of these texts is extremely clear. Whenever an operation is carried out using any funds from public sources, standards must be observed: this quite as much with a view to a wise employment of these funds as with a concern to make them contribute to the economic organization of the country.

2. In the private field, contracts are free to make or not to make reference to standards. But the express reference to a standard, or the use of a term equivalent to such a reference, does engage the parties under civil law. Even in the absence of such reference, the experts and judges called upon to decide a possible dispute must necessarily base their conclusions on the contents of standards when they exist.

In particular, the fact that standards are becoming more and more currently used within the professions tends to invest many of them with the character of a written codification of the "rules of art", or of "honest and regular customs". The professional, in turning to them, in principle puts himself under the protection afforded by the tribunals to all who follow these rules or customs, so long, naturally, as no errors are made in applying or interpreting the standard.

Furthermore, in case of damage to third parties, the standard can aid in setting up the elements and the limitations of civil responsibility.

3. One outstandingly perfected form of making reference to standards consists in stamping on the products themselves the national mark indicating conformity with standards, under the very strictly regulated conditions set up by the law instituting such mark.

4. A standard may, in so many words, be made generally obligatory at the national level. However, to guard a certain flexibility in the application of standards made obligatory within the frame-work of the decree of 24 May 1941, a procedure for waiving same has been set up; the requests to have application waived are heard without delay by AFNOR; the final decision is made by the Commission of Standardization.

5. Finally, all authorities having the power to issue regulations are naturally led to take ratified standards as the basis for certain of their impositions.

Every agency having the authority to impose regulations is led naturally to take as the basis for certain of its dealings standards which have been ratified. The standard or some part of the specifications of the standard will thus be included in a regulation and will derive its comulsory strength therefrom.

6. Certain texts requiring the use of standards refer to the national mark indicating conformity with standards, specifying that, by virtue of the constant appearance of the mark on a product, the maker, seller or installer of that product is recognized as being in line with the legal requirements.

It is to be remembered, we repeat, that the authoritative steps just defined are only imposed in a minority of cases: as a general rule, the application of standardization in France takes place in a liberal atmosphere, and its growth by leaps and bounds at present is essentially based on the advantages which it affords.

I. Number of Standards Published

At the present time there are over 4,800 French standards, to which may be added some 5,000 official French technical specifications (technical laws and ordinances, specifications, or articles and conditions etc.).

J. Other Periodical Publications

AFNOR publishes periodically:

- the approved Catalog of French Standards;

- Le Courrier de la Normalisation, bi-monthly illustrated review;
- Le Bulletin Mensuel de la Normalisation Francaise, monthly bulletin;
- les "Guides de l'Acheteur"(Buyers' Guides).

AFNOR also publishes pamphlets and other works on standardization.

K. Mark Indicating Conformity with Standards

It can be of value to have the standardized product sanctioned by a mark guaranteeing conformity to standards. An efficient means is thus created to encourage respect for standards and the user has an indication which may aid his choice.

Various national marks for conformity to standards have gradually appeared in a number of countries (BS in England, DIN in Germany, NENORM in the Netherlands, etc.). In France, the national mark of conformity to standards, or National Mark NF was set up by the decree-law of 12 November 1938 (art. 4). The decree of 24 May 1941 and the interministerial order of 15 April 1942 have accorded to the NF Mark its present status.

The administrative handling of the mark requires a Directing Committee and individual committees whose members are named by the Commissioner for Standardization on the recommendation of the General Director of AFNOR.

The Directing Committee, consisting of 12 members, takes on the double role of coordination and authority, though it largely decentralizes its activity in favor of the individual committees.

The individual committees function in each branch of industry where their creation has been felt to be of value, in agreement with the interested professionals. Conforming to the general Directives of the Directing Committee, they set up their own rules, investigate requests, have tests made by laboratories or experts, propose any eventual sanctions, in short each plays its part in the essential task of managing the sector confided to it.

The National Mark NF essentially covers the fields of domestic economy and building construction:

- Electrical appliance apparatus
- Coal heating and cooking apparatus
- Pressure-cooking apparatus
- Domestic electrical appliances
- Refrigeration apparatus
- Apparatus using combustible gas (city gas, natural gas, butane, propane, propanated air)
- Articles of furnishing: furniture and office furniture
- Letter boxes
- Burners of liquid fuel
- School notebooks
- Fruits and vegetables

- Metal stoves using liquid fuel
- Kitchen utensils and butcher-shop utensils in cast aluminum
- Concrete blocks
- Hydraulic binders
- Building hardward.

However, they apply to a small percentage of standards only, those which cover all the characteristics of certain materials or objects and in such a way that these latter may enjoy a real prestige in the national or international market. Purely dimensional or otherwise incomplete characteristics could indeed be standard in articles of doubtful quality, without their meriting the stamp of approval of a French national mark. Although the concern for quality is not directly written into the law covering the mark, because the definition of so vague a term would lead to endless discussions, it figures significantly in the awarding of the Mark NF.

This quality-favoring propensity of the Mark NF has led the public authorities to base a long-term policy thereon, seeking to "centralize around a single national mark, functioning on liberal and contractual lines but having legal status, certain collective efforts towards definition, improvement and control of quality, guiding them to take the form of written rules, public procedures and systematic checks which constitute the foundations of the National Mark NF". By virtue of this, the Mark may be coupled with any collective

mark that meets certain technical and administrative conditions, the whole thereby taking on the national character and the legal status of the Mark NF.

GERMANY

DEUTSCHER NORMENAUSSCHUSS (DNA)[1]

A. Origin

The Deutscher Normenausschuss was set up in May 1917 by the Verein Deutscher Ingenieure (VDI - Society of German Engineers) as the "Normalienausschuss fur den allgemeinen Maschinenbau" (Standards Committee for General Mechanical Engineering), from which arose in December 1917 the "Normenausschuss der deutschen Industrie" (Standards Committee of the German Industry). The final change of title into "Deutscher Normenausschuss" was decided upon in November 1926 due to the fact that standardization had grown beyond the narrower range of the industrial field.

After World War II, the Deutscher Normenausschuss was authorized by the Allied Control Authority in Berlin, on 31 December 1946, to continue its work in the whole of Germany.

B. Creation

18 May 1917, is considered as the date of creation.

C. Members: Nature and Number

The Deutscher Normenausschuss is a registered associa- with its seat in Berlin. The members of the DNA are industrial firms or associations of them; at present the number of members is about 5,000; membership is voluntary.

D. Finances

The DNA is financed partly by members dues, and partly by the sale of DIN standards and booklets dealing with standardization.

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[1] From reference 42.

For large sections, the DNA has established special secretariats (Fachnormenausschusse - Sectional Standardization Committees) with additional financing by the industries concerned.

E. Staff

On 31 December 1961, the number of employees in the three offices of the DNA amounted to

- 116 in our Administration Office in West Berlin
- 31 in our Branch Office in Cologne, and 40 of these employees are engineers.

Our sectional standardization committees, with their secretariat outside of the three DNA offices, employ their own staff; the biggest of these committees is the FNE (Fachnormenausschuss Elektrotechnik) with 25 employees (nine of whom are engineers).

F. Organizational Structure

The organizational structure of the DNA is as follows:

- Members Assembly
- Council
- President
- Managing Director with Administrative Office
- Working Committees
- Standards Examining Board

There are 25 sectional committees (colours, machine construction, iron metallurgy, textiles and textile machines, building construction, etc.), and more than 1000 study circles grouped in more than 100 working committees.

G. Functioning

The working committees are affiliated either directly with the DNA Administration Office, or to one of the special secretariats mentioned under section D. The work of all the committees is subject to directives enacted by the Council of the DNA. These directives determine the structure of the committees, the functions of the chairmen and foremen as well as of the sub-committees; they also prescribe the working procedure with the essential view that standards are only prepared once the collaboration of producers, consumers, authorities and scientists is assured.

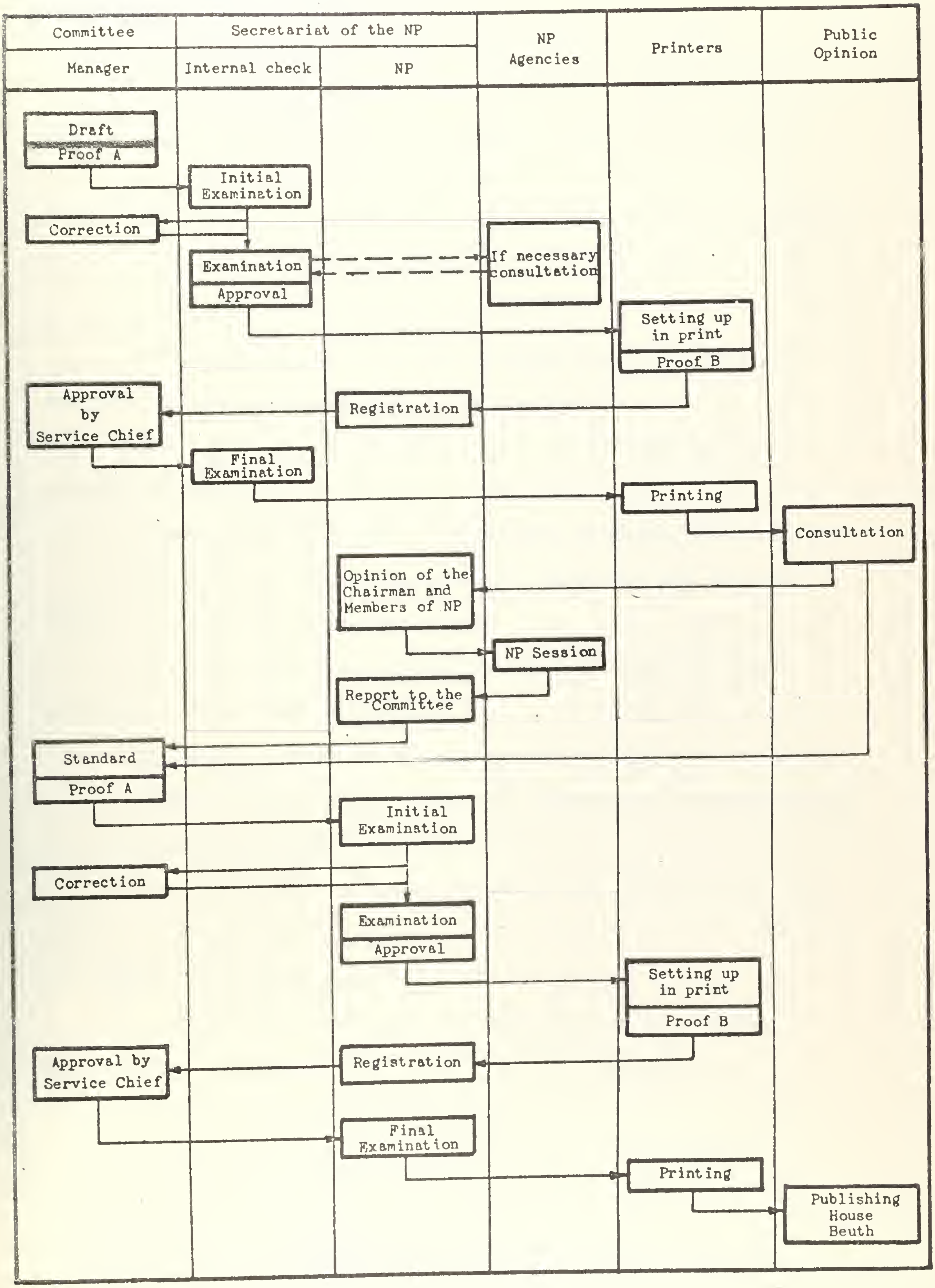
The results of work achieved are submitted to the Standards Examining Board for checking, with a view to co-ordination with other working committees and with regard to the formal structure of standards. The basis for drafting standards is a style manual (DIN 820), which is studied by a special committee (Normungstechnik - standardization techniques).

H. Methods Used for Drafting Standards

The draft standards are published to be commented upon by members of the Council and by the public. All comments are checked and taken into account by the committee concerned, and then the manuscript is again submitted to the Standards Examining Board.

The development of a German standard is to be seen from the diagram on the following page.

Collaboration between the DNA and the Standards Study Committee (NP)[2]


Committee
Manager
Secretariat of the NP
Internal check
NP
NP Agencies
Printers
Public Opinion
Draft
Proof A
Initial Examination
Correction
Examination
Approval
If necessary consultation
Setting up in print
Proof B
Approval by Service Chief
Registration
Final Examination
Printing
Consultation
Opinion of the Chairman and Members of NP
NP Session
Report to the Committee
Standard
Proof A
Initial Examination
Correction
Examination
Approval
Setting up in print
Proof B
Approval by Service Chief
Registration
Final Examination
Printing
Publishing House Beuth

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[2] From reference 42.

I. Nature of Standards

All the German standards are issued by the DNA with the mark DIN. They are classified according to their contents, their range or the degree of standardization effected as follows:

- Communication standards (conceptions, terms, symbols)
- Classification standards
- Type standards (types, sizes)
- Projection standards (directions regarding design and projection, calculation, construction)
- Construction standards (construction details for technical products)
- Dimension standards (dimensions, threads, tolerances)
- Material standards (physical, chemical and technological properties of materials)
- Quality standards (quality requirements for manufactured and natural products)
- Procedure standards (working and testing procedures)
- Supply and service standards (technical specifications of delivery for industrial products)
- Safety standards (protection of life and health as well as reliability in service).

J. Number of Standards Published

The standardization work of the DNA now comprises about 8,700 standards and 1,500 draft standards.

K. Other Periodical Publications

The DNA publishes monthly an information bulletin, "DIN-Mitteilungen" (DIN Information) and, annually, a catalog of German standards.

Furthermore, the DNA has published a large number of works on standardization, the list of which is to be found in a booklet entitled "Normungs Literatur" (Literature on Standards).

L. Marks Indicating Conformity with Standards

Each firm manufacturing products in conformity with DIN Standards is entitled to use the mark DIN for these products. No supervision is carried out by the DNA; misuse of the mark DIN may involve prosecution. The DNA has followed this procedure for several decades.

Affiliated with the DNA is a special committee called RAL - Ausschuss fur Lieferbedingungen und Gutesicherung (committee for delivery requirements and quality protection), for granting licences for quality marks. Quality groups for various fields of industry are set up, the member firms of which have contracted to meet the requirements with regard to the quality mark concerned. If any of the member firms of such a quality group transgresses the rule, it is expelled from the group.

SPAIN

INSTITUTO NACIONAL DE RACIONALIZACION DEL TRABAJO (IRATRA)[1]

A. Origin

On 11 December, 1945, the Administrative Council of the "Patronato Juan de la Cierva" for technical research, part of the Higher Council for Scientific Research ("Consejo Superior de Investigaciones Cientificas"), approved the report of its Council for Technical Evaluation and adopted the following bases on which the National Institute for the Standardization of Work was established.

> Bases (Excerpt):
>
> The chief specific concerns warranting the organization of the National Institute for the Standardization of Work may be listed as follows:
>
> The scientific organization of work in the various branches of production.
>
> Standardization of all the elements of production or of tooling in the nation, wherever their nature or application justify or require it.
>
> The utilization as far as possible of residual and waste matter from productive processes.
>
> Psycho-technics, as applied to productive processes.
>
> Prices and their fixing, analyzed from the point of view of the influence upon them of production methods and the efficiency thereof.
>
> The co-ordination of all the above-mentioned elements, constituting the general plan for work standardization in the nation.
>
> The task of the Institute and its Sections should be limited to the development of a body of practical rules in each of the concerns treated, which, when formed into principles, instructions and standards, will be made available to all groups and sectors of the economy responsible for the development of production.

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[1] From reference 42.

As a glance at these "bases" for the work leading to the foundation of the Institute will show, instead of adopting the ordinary criterion of considering the various problems to be studied and solved as independent questions, the effort was here made to think of them as a whole, with the idea that each was merely one facet of the organic process of production; and the concept of assuring the co-ordination of work done in each special field was held to be the basic orientation, rigorously observed in the whole process of developing the Institute.

B. Creation

On 6 June 1946, the Higher Council for Scientific Research approved by resolution the creation of the Institute. On 10 June, Mr. Aureo Fernandez Avila was appointed President of its Technical Administrative Council, and a few days later, the other Council Members - among them Mr. Antonio Gonzalez de Guzman as Secretary. The first steps in its organization began at once, account being taken of various scattered tasks previously undertaken, so as to tie them into the work of the Institute.

The chief aims of the Institute, defined in Article 2 of its statutes, are as follows:

1. To spread knowledge of the principles of standardization capable of bringing about greater efficiency of national work in industrial and technical fields;

2. To encourage the study, teaching and application in use of scientific principles, and of rational methods having to do with the various aspects of production.

3. To give counsel to the State and to provincial and municipal bodies, as they may require same, concerning measures having to do with applying standardization principles in public services, in social services and in technical teaching in general;

4. To see to it that the application of standardization principles is carried out with the profoundest sense of individual and collective responsibility:

5. To represent Spain at congresses and other international meetings having to do with standardization, as well as in dealings with similar foreign organizations with which the Institute will endeavor to establish regular and permanent relations for the exchange of documents, results of research, and practical realizations. Such representation will, in each case, be precisely defined in accordance with the organizations in question.

To achieve these aims, the Institute will undertake the following tasks:

The scientific organization of work in the various branches of production.

Standardization of all the elements of production or of tooling in the nation,wherever their nature or application justifies or requires it.

The utilization as far as possible of residual and waste matter from productive processes.

Psycho-technics, as applied to productive processes.

The study and orientation of problems connected with production costs and prices, as well as those which may arise from the effect of the afore-said factors on production methods and their economic efficiency.

The co-ordination of all studies made for the purpose of resolving the above problems, integrating the results so as to draw up an overall plan for standardizing the work of the nation.

In Article 4, it is stipulated that "to assure the proper development of the tasks enumerated above the National Institute for the Standardization of Work may adopt, among others, the following:

- The carrying out, the publication, and the publicizing of works on matters dealing with standardization which may aid in achieving these ends.

- The organization of services needed to counsel and aid existing or newly-created industries upon request, in all that has to do with the improvement of their production or distribution; and, in the event that the Institute elects not to afford said services itself, it may, as it deems necessary, entrust same to one or another official or private organization.

- The setting up of professional bodies which, under its direction, may carry on specialized work in connection with standardization.

- The Institute may serve as liaison among public and private organizations of every sort whose tasks are related to its aims, as well as with those working in the same field abroad.

- The encouragement of agreements among enterprises intended to effect a better utilization of their respective production.

- The proposing to the competent bodies of timely steps to enable practical application of research studies already effectuated.

- The use of criticism and discussion as indispensible for reaching positive and satisfactory results.

- The organization of conferences, courses, competitions, and congresses, together with the creation of study scholarships in Spain and abroad.

C. Members: Nature and Number

All persons and all sectors of the national economy interested in its tasks may collaborate with the Institute; and they may become members of the Institute in one or another of the following classes:

1. Honorary Members
2. Collective Members
3. Individual Members
4. Associate Members

The Honorary Members are named by the "Patronato Juan de la Cierva", on nomination by the Technical Administrative

Council of the Institute, from among those eminent personalities who have done outstanding work in theoretical or practical aspects of the special field with which the Institute is concerned.

Collective Members can be scientific, technical, industrial, or economic bodies, as well as official centres requesting and being granted admission of the Technical Administrative Council. To this effect, the Council fixes the number of representatives for each such body who may participate in the Assembly, and this number always reflects the importance of the body in question.

Individual Members are those persons who seek admission and are of well-recognized competence as shown by their works or publications on matters having to do with the special field of interest of the Institute, and who possess the other qualities required for this class of membership.

Associates are all those interested in the aims of the Institution who seek admission as such.

All members of the Institute except Honorary Members pay annual dues, the minimum of which is set by the regulations of the Institute.

All members have the right:

- to receive the Institute's Review.

- to consult the Institute during the year and place before it any questions of a technical or economic sort they may wish, on matters connected with the work of the Institute.

- to present communications to the General Assembly and to take part in the discussion in meetings of all similar communications properly presented in conformity with the conditions stipulated in the letter convening the Assembly.
- to use the technical services of the Institute.

There are at present 444 Individual Members
528 Collective Members
762 Associate Members
or a sum total of 1,734 Members.

The Assembly is composed of all the members of the Institute and must meet at least once a year when convened by the Technical Administrative Council, which constitutes the Bureau of the Assembly. At the meeting, a report is made to the members on the scientific and technical work accomplished during the year, and a conference discussion is held on all communications of this sort suitably presented.

D. Finances

The budget of income and expenditures of the Institute is around 7,500,000 pesetas per year, 50% of which derives from grants accorded by the "Patronato Juan de la Cierva", The Ministry of National Education, etc., and 50% from membership dues, sales of publications and registration fees for courses organized by the Institute.

E. Staff

The Institute's personnel, classified in the various categories, is as follows:

Employees with higher degrees (doctors, engineers, etc.)	-41
Supporting technical personnel	-11
Office and administrative staff	-31
Others	-10
Total	93

F. Organizational Structure

The Technical Administrative Council constitutes the directing and also the representative organism of the Institute, being composed of a President, Secretary and Councillors, all of whom are named and, if need be, removed from office by the Presidency of the "Patronato Juan de la Cierva", on the proposal of the Administrative Council in accordance with the stipulations of Article 5 of the by-laws of the said "Patronato". Only highly qualified persons and technical or economic representatives of interested professional organizations are nominated. With respect to standardization, the Council acts as an evaluating commission for standards and is empowered to give final approval to proposals submitted by the Technical Work Commissions. The President of this Council acts as Director of the Institute, and its Secretary as the General Secretary.

The head of the Institute is the Director, who is also President of the Technical Administrative Council. He is the chief of all the departments and services of the Institute and is responsible for their functioning.

The General Secretary is immediately under the Director. He is the Secretary of the Council and his task is to coordinate the work of the department.

The Departments are as follows:

1. Department of the Scientific Organization of Work
2. Department of Standardization
3. Department of Utilization of Residues and Waste Matter
4. Department of Psycho-technics
5. Department of Prices and Costs
6. Bureau of Statistics
7. Other organisms found necessary to achieve the aims of the Institute

Each of these departments has its chief, who is appointed upon the nomination of the Institute's directing body.

To assure a permanent contact with the varied sectors of production, a classification has been made of Spanish industry and a number of Technical Work Commissions have been found helpful in giving each of these sectors suitable liaison with the Institute.

The Technical Work Commissions are set up under resolutions of the Technical Administrative Council and are composed of a President and a number of carefully chosen members, selected from among persons having a high reputation in the field of industry in question and acquainted with all the problems, both technical and economic, involved in their special field. Users' and consumers' organizations are represented as far as possible in these commissions, as well as the research centres, official bodies, and private enterprises interested in standardization. Each commission has a Secretary, a functionary of the Institute's administration.

The presidents of the commissions are named by the Technical Administrative Council of the Institute, and in

turn propose the secretary and the members, who then are also named by the Council.

At present, the following Technical Work Commissions have been set up:

TWC No. 1	General Affairs
TWC No. 2	Nomenclature
TWC No. 3	Psychology
TWC No. 4	Social Sciences
TWC No. 5	General Sciences
TWC No. 6	Medicine
TWC No. 7	Testing Materials
TWC No. 8.	Steam Engines
TWC No. 9.	Boilers
TWC No.10	Heat Motors
TWC No.11	Compressors, Pumps, Refrigerators and other Auxiliary Machines.
TWC No.12	Hydraulic Machines
TWC No.13	Workshops
TWC No.14	Welding
TWC No.15	Tools, Machine Tools
TWC No.16	Machine Parts
TWC No.17	Means of Attachment
TWC No.18	Controls, Ball Bearings, Gears
TWC No.19	Tubes and Flanges, Valves and Accessories and Various Distribution and Irrigation Organs
TWC No.20	Electro-technics
TWC No.21	Exploitation of Electric Lines
TWC No.22	Mining and Extraction Industries
TWC No.23	Military Technique
TWC No.24	Civil Engineering
TWC No.25	Railway Material
TWC No.26	Automobile Material
TWC No.27	Naval Construction
TWC No.28	Aircraft
TWC No.29	Hygiene
TWC No.30	Sub-Commission on Plastics
TWC No.31	Powders and Explosives
TWC No.32	Fuels
TWC No.33	Fermentation Industries
TWC No.34	Agricultural and Food Industries
TWC No.35	Fishing Industries
TWC No.36	Iron Smelting
TWC No.37	Metals, Bronzes, Brass
TWC No.38	Light and Special Alloys
TWC No.39	Illuminating Gas Industries
TWC No.40	Textile Industries
TWC No.41	Construction Industries

TWC No.42	Architecture
TWC No.43	Technical Glass and Optical Industries
TWC No.44	Agriculture and Farm Machines
TWC No.45	Photography
TWC No.46	Various Industries
TWC No.47	Domestic Economy
TWC No.48	Paints, Varnishes
TWC No.49	Packaging
TWC No.50	Documentation
TWC No.51	Liquid Fuels
TWC No.52	Scientific Organization of Work
TWC No.53	Plastics and Rubber Industries
TWC No.54	Graphic Arts
TWC No.55	Fats and Detergents Industries
TWC No.56	Forests and Forestry Industries
TWC No.57	Cellulose and Paper
TWC No.58	Load-Lifting Machines

These Commissions may be enlarged or divided by decision of the Institute's Council, as needed for the work they may be doing. They are also authorized to form reporting committees and to maintain contacts of all sorts with outsiders for the study of the standards. They can also propose the admission of new members if they feel it necessary.

The distribution of questions among the commissions is done on the basis of the Universal Decimal Classification. This criterion was adopted to avoid functional overlapping among the TWC's. This latter can be easily detected and avoided by delimiting the scopes of several TWC's dealing with the same general subject.

G. Functioning

1. Information Service on Standards

The Institute has set up an Information Service on foreign Standards, in which all the latter are catalogued and classed as soon as received.

At present, this Information Service has about sixty thousand foreign standards in its archives, and continues to receive all those published by the organizations with which the Institute maintains regular exchanges of publications.

This information office provides the following services:

a) When foreign standards are received, it so informs the Technical Commissions which might be interested. All issues of the review "Racionalizacion" contain an index of foreign standards received, as arranged by the C.D.U.

b) It provides the Technical Commissions and the Institute's Departments with all the data and information they need to carry on their tasks.

c) It furnishes all the information requested by members and associates of the Institute.

d) It takes the necessary steps to obtain from foreign organizations corresponding to the Institute those standards requested by members and associates.

e) Although the members and associates are the only ones having the right to the services of the information office, it may afford the services mentioned in c) and d) above to any other enterprise or technician so requesting.

f) The Information Service has a reading room open to the public in general during office hours.

g) It has also organized a reproducing service for photocopying and microfilming documents and for magnifying the latter for reading.

Information supplied to the Technical Commissions is free. That afforded to members and associate members, as well as that for the public (except for reading and daily consultations), involves a payment in accordance with the Institute rates to cover expenses and costs of correspondence.

2. Liaison with National Industries and other Research Centres

As will be seen further on (when we explain the procedure adopted in the preparation of a standard), every possible means has been sought to assure permanent contact with technical research centres and national industry. We give in specific detail the various steps and points at which this liaison takes place.

First of all, the Technical Commissions are composed of persons of very great reputation in their several special fields of industry or technique, and the effort is also made to enlist the representatives of both producers and consumers. Wherever, for one or another of such special fields, there exists a body outside the Institute which is devoted to research, as for example the Spanish Electro-Technical Association, the National Institute of Aeronautical Technique, the Iron and Steel Institute, the Psycho-technical Institutes, etc., the effort is made to have their representatives in the Technical Commissions involved. The Ministries and other official centres interested in certain problems are also represented in these Commissions; and this same criterion

applies in the case of unions. It is thus easy to see that the Institute is a true meeting ground for the whole national economy.

Functional co-ordination among the Technical Commissions is assured by the direct contact of their presidents with the President of the Institute, and of their secretaries--who, as we have said, are functionaries of the Institute--with the General Secretariat to which they are directly answerable. One of the tasks of the General Secretariats is precisely to assure this co-ordination in the normal development of the work, and to propose measures to the Institute's Presidency to further this aim.

More particularly with respect to the standards, when a proposed standard is drawn up in agreement with the Technical Commission and the Department of Standardization, this proposal is not only published in the review "Racionalizacion" with a view to public enquiry--this review being received by all members and associates, but printed copies are also sent to industries and organizations which might be interested, and their opinions solicited.

Criticisms thus obtained are again studied by the Technical Commission and by the Department of Standardization, and it is only after this last study that a "definitive proposal" is submitted to the Evaluating Commission of the Institute, which studies it in turn, before declaring it a UNE standard (UNE = Una Norma Espanola--"A Spanish Standard").

All this means that every possible precaution is taken to assure that the standards set up may be workable and applicable. This was all the more essential in virtue of the fact that the Institute has always firmly maintained that the application of UNE standards should be wholly free and voluntary.

H. Methods Used for Drafting Standards

The study of draft standards begins with an agreement with the Technical Work Commission. This agreement may be adopted:

1. Upon instructions of the Institute's Management;
2. Upon instructions of the Standardization Department;
3. By decision of the Technical Committee itself;
4. Upon the proposal of some interested, professionally recognized organization.

This study passes by the following stages:

Stage 1 When a draft standard is taken up for study, the TWC so advises the Institute, whose Department of Standardization sends back national and foreign information it may have on the subject, or takes the necessary steps to obtain the data desired by the TWC.

The TWC names a committee of reporters to study each draft or group of draft standards. These committees have no fixed organization or composition, but are named as seems most suitable in each case.

The minutes of the meetings of the TWC's must contain an account of the work done by them, and are sent to the Institute where they are studied by the Director and the General Secretariat, and by the Chief of the Department of Standardization, all of whom are thus in a position to co-ordinate the work from the start, and step in if they feel it necessary.

Stage 2 The work of the reporters' committee is submitted to the TWC for study, and when agreement is reached on the draft standard the TWC sends it to the Department of Standardization, with an explanatory note bringing out the reasons prompting the consideration of the proposal, the urgency and necessity of the standard, its advantages and disadvantages, and its relation to other national or foreign standards.

Stage 3 The Department of Standardization studies the proposal, both to ascertain whether it measures up to the general criteria of the Institute, and to check its co-ordination with the other UNE standards, already published, or else to order that it be studied by other TWC's. Following this, it proposes to the Institute heads that it be approved as a UNE Proposal.

Stage 3_1 If the Institute heads agree with the proposal, they order publication in the review "Racionalizacion", edited by the Institute.

Stage 3_2 When the review publishes the UNE Proposal and the explanatory note, the enquiry period begins. This latter generally takes three months, but a longer period may be allowed.

Separate reprints of the UNE Proposal published in the review are sent to the TWC so that the latter may send them out for study by the professional and other organizations interested, requesting them to examine and criticize the proposal. Certain technical reviews reproduce UNE Proposals connected with their fields.

Comments received by the Department of Standardization and by the TWC are studied by this latter, which then frames its definitive proposal.

Stage 4 The Department of Standardization again reviews this proposal, and then if it is in agreement, it presents same to the Institute's Management. Or it can also send the proposal back to the Commission with its comments.

Stage 5 If the Directors favor the proposal, the latter is submitted to the Technical Administrative Council which, as Evaluating Commission, decides whether or not it should be definitively approved. When approval is given, the proposal becomes a UNE Standard.

Stage 6 The text approved by the Council goes to the Department of Standardization which has the task of preparing the definitive edition of the UNE Standard. The Institute's Commercial Service takes care of distribution and sales.

I. Nature of Standards

The use of UNE Standards is wholly voluntary, both as regards private persons and official organisms. But there is nothing to prevent such an organism from declaring, on its own initiative, that a standard is obligatory within its jurisdiction.

J. Number of Standards Published

At present the number of UNE Standards definitively established is 1,750. There are 220 at the investigation stage, and 1,163 at earlier stages of study.

K. Other Periodical Publications

Aside from the UNE Standards, the Institute issues the following publications:

- The bi-monthly review "Racionalizacion" (Standardization)
- The monthly "Boletin de Informacion de Organizacion Cientifica" (Information Bulletin on Scientific Organization)
- The bi-monthly "Boletin de Informacion de Aprovechamiento de Residuos" (Information Bulletin on the Utilization of Wastes)

L. Marks Indicating Conformity with Standards

The letters UNE are the initials of the words "Una Norma Espanola" (A Spanish Standard), and are registered as an industrial or trade mark in the Registry of Industrial Property on 21 October, 1948, the Institute then obtaining exclusive rights to their use. This mark was thus officially registered and patented, on the one hand to guarantee the source and authenticity of standards set up by the Institute, and on the other hand to be able to use it as a seal of quality.

The Institute has not yet fully organized this service.

UNITED KINGDOM

BRITISH STANDARDS INSTITUTION (BSI)[1]

A. Origin

The British Standards Institution developed from the Engineering Standards Committee formed by the Institution of Civil Engineers, Institution of Mechanical Engineers, Institution of Naval Architects, Iron and Steel Institute, and Institution of Electrical Engineers in 1901.

B. Creation

First known as the British Engineering Standards Association, the Institution was incorporated in 1918, and granted a Royal Charter in 1929, the present title being adopted in 1931. The objects of the Institution as set out in the Royal Charter are the following:

1. to coordinate the efforts of producers and users for the improvement, standardization and simplification of engineering and industrial materials so as to simplify production and distribution and to eliminate the national waste of time and material involved in the production of an unnecessary variety of patterns and sizes of articles for one and the same purpose.

2. to set up standards of quality and dimensions, and prepare and promote the general adoption of British Standard specifications and schedules in connection therewith and from time to time to revise, alter and amend such specifications and schedules as experience and circumstances may require.

[1] From reference 42.

3. to register, in the name of the Institution, marks of all descriptions, and to prove and affix or license the affixing of such marks or other proof, name, letter, description or device.

4. to take such action as may appear desirable or necessary to protect the objects or interests of the Institution.

C. Members: Nature and Number

There are two classes of membership:

1. subscribing membership which is open to any person who is a British subject, and to any body which is constituted, formed or incorporated under the laws of any part of the British Commonwealth of Nations;

2. membership of BSI Committees.

The number of members in the first class stands at present at over 11,000. The Committee membership stands at approximately 17,500.

D. Finances

The Institution is financed by subscriptions from firms, trade associations, professional institutions and other bodies, by a Government grant, and by the sale of publications.

E. Staff

The staff of the Institution totals about 450. Of the senior staff approximately 50 are concerned with administration, finance, services to consumers and publicity. 85

are technical officers with engineering and scientific qualifications, concerned with the work of preparing British Standards and providing the Secretariat of the technical committees, and 20 are officers responsible for inspection and testing in connection with the approval of electrical goods sent to Canada, and testing for compliance with British Standard Certification Mark schemes.

F. Organizational Structure

The BSI is organized through councils and committees. The responsibility for general policy lies with the General Council, which reports annually to the General Meeting of subscribing members. Detailed control is exercised through an Executive Committee and Finance Committee. The preparation of British standards is carried out by technical Committees consisting of representatives of the main interests concerned with the subject for which the committee is responsible. These technical committees report to the appropriate industry standards committee, which authorizes the initiation of a standard project, approves the final draft, and decides the priorities of the projects authorized.

To co-ordinate the work of related industry standards committees and to deal with questions of policy affecting more than one committee, there are four divisional councils--for building, engineering, chemicals and textiles respectively. A Council for Codes of Practice was set up in 1954

and is responsible for British standard codes of practice in the building and engineering fields. Under it there are various codes of practice committees and code drafting committees. Certain committees, including some of the same level as industry standards committees, which do not come within the sphere of a divisional council, report direct to the General Council.

There are a number of advisory committees which are not concerned themselves with the preparation of standards but which advise the Institution on standards problems in particular spheres, e.g., the Local Authorities Advisory Committee and the Advisory Council on Standards for Consumer Goods.

G. Functioning

The main work of the BSI is the preparation and publication of British standards and codes of practice. This is carried out by agreement among the interests concerned--manufacturing, using, professional, and distributive. As far as possible the committee concerned with the British standards in a particular field will be responsible for the policy adopted by the United Kingdom representatives in the corresponding international committee.

The BSI administers Certification Mark schemes (See Section L) and a scheme in collaboration with the Canadian Standards Association whereby U.K. manufacturers of electrical equipment may have their goods certified in this country

as conforming with the requirements of the Canadian Authorities.

H. Methods Used for Drafting Standards

Before work is started on a proposed standard, it must be clear that there is support for it from responsible bodies concerned. The standard is then put into the form of a first draft by a representative technical committee and circulated as a "draft for comment" to all the principal interests concerned. The draft is then reconsidered by the technical committee in the light of comments received. After general agreement by the committee the draft comes before the relevant industry standards committee for approval for publication. Where disagreement occurs in the preparation of a standard, and cannot be overcome at the technical level, the problem is referred to the Executive Committee of the General Council for settlement.

I. Nature of Standards

British standards are documents embodying the agreement of the interests concerned in this country on such matters as quality, dimensions, performance, methods of test, terms, definitions and symbols, and codes of practice for installation, maintenance, and general conditions of operation.

The use of such standards is entirely voluntary except insofar as they are incorporated in statutory regulations. In certain cases the standard requires that if compliance

with it is claimed, the manufacturer concerned must participate in the relevant certification mark scheme.

J. Number of Standards Published

The total number of standards published to date (1960) stands approximately at 4,000. 297 new and revised standards were published in the year 1959-1960.

K. Other Periodical Publications

In addition to British standards, the BSI also publishes the following documents:

"British Standards Yearbook" containing a list of all current British standards, ISO Recommendations, I.E.C. publications and CEE specifications with a summary of each. The relationship of the international documents with any corresponding British standard is indicated;

"Annual Report" containing an account of the work of the various divisions of BSI and of the work of the ISO and I.E.C. Committees;

"BSI News", a monthly bulletin;

"Consumer Report")
for domestic consumers.
"Shoppers Guide")

L. Marks Indicating Conformity with Standards

The BSI is the registered owner of a Certification Mark, which may only be used under license granted by the BSI on certain conditions and according to the Regulations deposited with the United Kingdom Register of Trade Marks. These Regulations require the manufacturer to satisfy the BSI that his product complies with the relevant standard

and to undertake to accept the BSI's scheme of supervision and control in relation to that product. Such a scheme covers periodic checking by BSI of the manufacturer's production processes and works control and repeated testing of a sufficient sample of the product so as to determine whether it is consistently manufactured in accordance with the standard.

At present the certification mark is used in connection with 170 standards and there are some 1,480 licensees.

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)[1]

A. Origin

1. The International Federation of the National Standardizing Associations (ISA), set up in 1926, comprised the National Standardizing Associations of about 20 countries. The ISA laid the foundations for international cooperation in the field of standardization, and made a great effort to further the unification of its Members' national standards.

It had to cease work officially in 1942, although as far back as 1939 circumstances had made it necessary for certain countries to withdraw their membership.

2. In 1944, the United Nations Standards Co-ordinating Committee (UNSCC), comprising the national organizations of 18 allied countries, succeeded the former ISA with a view to co-ordinating the activities of its Members' national industries. It was above all of value as a wartime organization.

B. Creation

On 14 October 1946 the representatives of the Members of UNSCC met in London, together with representatives of the standardization bodies of certain countries which were not members of UNSCC, in order to:

1. "discuss and approve the constitution of a new international organization whose object shall be to facilitate

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[1] Excerpted from Reference 27.

the international co-ordination and unification of industrial standards",

2. "draft recommendations concerning the technical work to be undertaken by the new Organization".

The discussions which took place between 64 delegates from 25 countries resulted in the setting-up of the International Organization for Standardization; the abridged form of its name is ISO. The provisional General Assembly of the ISO took place on 24 October 1946 in London.

During this General Assembly the ISO Constitution and Rules of Procedure were unanimously adopted, and it was decided that ISO should begin to function officially as soon as these provisions had been ratified by 15 National Standardization Committees. The fifteenth ratification was received by the provisional General Secretariat on 23 February 1947. The ISO had been created; it would continue to develop.

The Constitution and Rules of Procedure were subsequently ratified by other National Standardization Committees which had participated in the work of the Conference of London, and which thus became Members of the ISO. Other National Standardization Committees were thereafter admitted to membership in ISO.

C. Object

The object of the Organization shall be to promote the development of standards in the world with a view to facilitating international exchange of goods and services and to

developing mutual cooperation in the sphere of intellectual, scientific, technological and economic activity.

As means to these ends, inter alia, it may:

1. take action to facilitate co-ordination and unification of national standards and issue necessary recommendations to Member Bodies for this purpose;

2. set-up international standards provided, in each case, no Member Body dissents;

3. encourage and facilitate, as occasion demands, the development of new standards having common requirements for use in the national or international sphere;

4. arrange for exchange of information regarding work of its Member Bodies and of its Technical Committees;

5. cooperate with other international organizations interested in related matters, particularly by undertaking at their request studies relating to standardization projects.

D. Membership

The ISO Members are the National Bodies most representative of standardization (one for each country), who have agreed to abide by the Organization's Constitution and Rules of Procedure. As of May 1961, there were 44 members.

E. Finance

The functioning of the ISO is ensured by the financial contributions of its Members who, when they accept membership in the Organization, agree to pay an annual contribution the amount of which varies according to the importance of the country concerned.

F. Structure of the Organization

The ISO consists of a General Assembly, a Council, a President, a Vice-President, a Treasurer, a General Secretary and a General Secretariat, Technical Committees, and Technical Divisions.

The General Assembly is constituted by a meeting of Delegates nominated by Member Bodies; it is convened at least once every three years.

The provisional General Assembly met in London on 24 October 1946 with a view to adopting the Constitution and Rules of Procedure, electing the Members of the Council, choosing the President and determining the seat of the Organization.

The first General Assembly met in Paris on 7 July 1949. The official ceremony, which took place in the "Grand Amphitheatre de la Sorbonne", was honored by the presence of Mr. V. Auriol, President of the French Republic, and Mr. J. Torres-Bodet, Director-General of UNESCO.

The second General Assembly was held at Columbia University, New York, on 20 and 21 June 1952.

The third General Assembly was held on 17 and 18 June 1955 at the Riksdagshuset, Stockholm.

The fourth General Assembly was held on 19 and 20 June 1958 at Horrogate, (Yorkshire, United Kingdom).

The fifth General Assembly was held in June 1961 in Helsinki (Finland).

The Council, which is composed of the President and the representatives of 14 Member Bodies, is the administrative organ of the ISO; it meets at least once a year to enquire into the activities of the Organization and to report to the General Assembly. The Council commissions a Supervisory Committee, composed of the Vice-President, the Treasurer and a Member elected for one year, to assist the President and supervise the activities of the General Secretariat.

The General Secretary, elected by the Council, is the principal administrative officer of the Organization. He is in charge of the General Secretariat, which comprises such staff as may be required for the accomplishment of the technical and administrative work assigned to it by the Council.

The General Secretary, at the administrative level, ensures liaison between Member Bodies and the Council, receives subscriptions, regulates expenditure, circulates information of interest to Members and, in general, represents the ISO in its relations with other international organizations.

At the technical level, he co-ordinates the activities of the Technical Committees set-up by Member Bodies within the Organization.

Subject to the authority of the Council, he establishes Directives to guide Member Bodies and Technical Committees in their work. He supervises the application of the Directives and Rules of Procedure and the Constitution of the ISO.

The General Secretary has also, on the one hand, to keep all the Member Bodies, as well as the Council, informed of the work carried out by Technical Committees and, on the other hand, to keep the Technical Committees informed of work undertaken by other international organizations concerned with related questions.

The Technical Committees are composed of a delegation from each of the Member Bodies wishing to take part in the work of the Technical Committee. Each Technical Committee has a secretariat, which is undertaken by a Member Body designated by the Council. In its capacity as Secretariat this Member Body acts impartially; it has its own delegation with exactly the same status as other participating Members of the Technical Committee. It is responsible for the satisfactory conduct of the Technical Committee and has to report annually to the Council on the results achieved.

When a Technical Committee has reached agreement on a Draft Recommendation for some given question, the General Secretary submits the Draft to all Member Bodies, and then to the Council. Finally he undertakes the printing and publishing of the Recommendations or Standards adopted by the ISO. These Recommendations or Standards are then placed on sale by the Member Bodies.

Proposals for the study of new questions by the ISO and the setting-up of new Technical Committees are also dealt with by the General Secretary, who carries out an enquiry among the Member Bodies and submits the results to the Council for decision.

The activities of the ISO Technical Committees cover widely different fields, but not that of electricity. All questions of an electrotechnical character are dealt with by the International Electrotechnical Commission (I.E.C.) which was affiliated to the ISO in 1947. This Commission while preserving its autonomy, functions as the Electrical Division of the ISO.

G. Relations

The ISO, which is an international non-governmental organization, enjoys Consultative Status (Category B) to the United Nations (Resolution 95(v) 31 August 1947 and Resolution 133 (vi) 4 March 1948 of the Economic and Social Council). A Representative of the ISO ensures liaison with the United Nations' Headquarters, while a Liaison Officer keeps in touch with UNESCO, with which the ISO has a consultative arrangement and with the FAO.

The ISO maintains relations with functional and regional Commissions of the United Nations, certain organs of the General Secretariat and most of the specialized agencies of the United Nations. These relations are progressively broadening as the respective scopes of the Commissions, organs and specialized agencies increase.

On 17 November 1949, the ISO transmitted to the Economic and Social Council of the United Nations a "Statement on the subject of Co-ordination of international activities in the field of Standardization". This document was circulated by the United Nations under reference E/C.2/240 on

26 January 1950. Its object was to draw the attention of the United Nations to the need for co-ordinating in a rational manner the standardization activities of the various bodies occupied in this field; it proposed the ISO as the organ competent to ensure this co-ordination which would have the advantage of avoiding confusion or the setting-up of contradictory standards by different bodies.

- The ISO also maintains relations with many international technical organizations which request its collaboration for questions of standardization appearing on their program.

INTERNATIONAL ELECTROTECHNICAL COMMISSION (I.E.C.)[1]

A. History

During international electrical congresses held at the end of the last century, it was agreed that a permanent organization capable of carrying out electrotechnical standardization in a methodical and continuous manner was necessary. Colonel R. E. Crompton (United Kingdom) was entrusted by the St. Louis Congress, in 1904, with the organization of such a body.

During the first meeting held in London in 1906, the constitution of the International Electrotechnical Commission was discussed and provisional statutes were drawn up.

Fourteen National Committees having been officially formed, the Council of the I.E.C. met for the first time in London in 1908 and approved the first statutes of the Commission, which remained almost unchanged until 1949.

In 1947 the International Electrotechnical Commission became affiliated with the International Organization for Standardization (ISO) as its electrical division, whilst preserving its technical and financial autonomy. In this capacity, the Commission has at present consultative status (Category B) with the Economic and Social Council of the United Nations.

Since its foundation, the Commission has held many meetings which have led to the publication of important recommendations.

General meetings held since 1947 are as follows: Lucerne (1948), Stresa (1949), Paris (1950), Estoril (1951), Scheveningen (1952),

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[1] Excerpted from Reference 26.

Opatija (1953), Philadelphia Jubilee Meeting (1954), London (1955), Munich (1956), Moscow (1957).

B. Object of the I.E.C.

The object of the Commission is to facilitate the co-ordination and unification of national electrotechnical standards and to co-ordinate the activities of other international organizations in this field.

C. Members

Any self-governing country desiring to participate in the work of the Commission may form a committee for its own country and apply for membership of the Commission. This committee when it has been accepted as a member is known as the "National Committee".

The National Committees of the I.E.C. are composed of representatives of the various technical and scientific organizations which deal with questions of electrical standardization on the national level. Most of them are recognized and supported by their respective governments.

There is only one Committee for each country.

In 1958 thirty-three countries were members.

D. Methods of Attaining its Object

To attain its object the I.E.C. publishes recommendations which, as far as possible, express international agreement upon the subjects dealt with. Although I.E.C. Recommendations are not binding upon the member organizations, these latter are strongly recommended to follow them when drawing up their national specifications, so as to unify all national specifications and to facilitate commerce.

E. Organization

The work of the I.E.C. is carried on by a Council, a Committee of Action, a Central Office and Technical Committees.

1. Council. The administration of the I.E.C. is carried out by a Council composed of:

- a. the President of the I.E.C.;
- b. Presidents of National Committees, who are ex-officio Vice-Presidents;
- c. the Treasurer;
- d. the Secretary.

The council meets at least once every three years.

2. Committee of Action. The Committee of Action is elected by the Council. It is composed of the President of the Commission and 9 Vice-Presidents or their duly accredited deputies. The past-President, the Treasurer and the Secretary are members ex officio, but without vote. Members are elected for a period of 9 years, a third being elected at the end of each 3-year period.

The Committee of Action has authority to deal with all administrative questions in the interval between the meetings of the Council. It takes all decisions which it considers necessary to facilitate the technical work of the Commission. It reports all its decisions to the Council.

3. Central Office. The Central Office is the permanent office which sees to the execution of the decisions of the Council and which carries on the work of Secretariat of the I.E.C.: reproduction and circulation of documents, organization of meetings, accountancy. etc. Its address is the registered office of the I.E.C.

4. Technical Committees. The technical work of the Commission is carried out by Technical Committees, each dealing with a given subject. These are set up by the Council, or by the Committee of Action, on the

proposal of one or more National Committees and after all the National Committees have been consulted by the Central Office. The scope of the Technical Committee is fixed at the time of its formation and must be approved by the Committee of Action.

Any National Committee may be represented on any Technical Committee.

A Technical Committee has a Chairman and a Secretariat appointed by the Committee of Action. One of the National Committees is appointed as Secretariat and assumes responsibility for the progress of the work.

Technical Committees meet whenever their Chairman and Secretariat consider a meeting to be necessary, either during the general meetings of the I.E.C. or at some other date.

F. I.E.C. Recommendations

The texts which have been approved by the appropriate Technical Committees and ratified by at least four-fifths of the National Committees are published as Recommendations. A list of these recommendations can be obtained from the Central Office of the I.E.C., on request.

G. Activities

The work of the I.E.C. covers almost all spheres of electrotechnology, including both power and light current fields. It can be divided into two categories:

1. Work aiming at improving understanding between electrical engineers of all countries by drawing up common means of expression: unification of nomenclature; agreement on quantities and units, their symbols and abbreviations; standardization of systems of units; graphical symbols for diagrams.

2. Standardization of electrical equipment proper, involving the

study of problems of the electrical properties of materials used in electrical equipment, standardization of guarantees to be given for certain equipment as to the characteristics, methods of test, quality, safety, and dimensions controlling interchangeability of machines and electrical equipment.

The I.E.C. holds at least once each year a general meeting including meetings of a number of Technical Committees and a meeting of the Committee of Action.

H. Finance

The work of the Commission is financed by contributions from the National Committees.

The amount of these contributions is fixed by the Council.

I. Languages

The languages of the Commission are English, French and Russian. The I.E.C. Recommendations are published in two different editions, one in French and English, the other in Russian and English.

J. I.E.C. Relations

The I.E.C. maintains a liaison with those international organizations which deal directly or indirectly with electrotechnology, for the solution of problems of common interest.

COMITE PANAMERICANO DE NORMAS TECNICAS (CPANT)[1]

A. Origin and Purpose

In the year 1947, an invitation of the Brazilian National Standards Committee (ABNT) to create a single organization to promote the industrialization and to widen the markets of the Latin American countries, received the support of Argentina, Brazil, Chile, United States, Mexico and Uruguay; and the CPANT (Pan-American Standards Committee) was created to develop the necessary regional standardization work to improve the inter-American trade and to foster the industrial development of each American State.

B. Objectives

The objectives of the CPANT are clearly stated in the first article of its Constitution, as follows:

1. To foster cooperation among its active members and promote the knowledge of the standards developed by them.

2. To promote the recognition by governments, industrialists and public of the importance of standardization for scientific, industrial and economic progress, and for the welfare of the people.

3. To propose Pan-American recommendations which will guide its members in the technical development of their national standards, making the maximum use of existing standards.

4. To attain a higher degree of uniformity among the standards developed by its members as well as the identity of symbols. Terminology should be uniform among Spanish speaking countries and equivalent as far

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[1] Excerpted and translated from a private communication of Ing. Beatriz Ghirelli de Ciaburri, Provisional Executive Secretary, CPANT, and Executive Director, Argentine National Standards Organization (IRAM).

as language differences will permit among all nations. These uniformities should be Pan-American in the broad sense of the word and, as far as possible, identical to the ones of ISO and IEC.

5. To motivate the establishment of national standards organizations in those countries that do not presently have them and to ensure their active participation in the activities of the CPANT.

6. To maintain relations with the International Organization for Standardization (ISO) and with the International Electrotechnical Commission (IEC); to keep CPANT's recommendations and the standards of its members, as much as possible, in agreement with the recommendations of these organizations; to promote the participation of its active members in the technical committees of these international organizations; and to collaborate with its members in the fulfillment of the duties derived from that participation.

7. To establish, if it is convenient, relations with other international organizations such as the Organization of American States (OAS), the Pan American Union (PAU), and the Pan American Union of Engineering Societies (UPADI), whenever these relations will facilitate the achievement of its objectives.

C. Members

The CPANT Constitution establishes two classes of members:

1. Active Members--the standards organization of each country which is effectively represented.

2. Associate Members--A country possessing no standards organization may participate by the associate membership of technical, industrial and business organizations that presumably could in the future

originate a standards organization. These associate members will not have the right to vote.

The present members of the CPANT are: Argentina, Brazil, Colombia, Chile, United States, Mexico, Peru, Uruguay, and Venezuela.

D. Organizational Structure

In the present constitution a General Secretariat with all the executive officers has been provided to manage the work of the CPANT. The CPANT is governed by a General Assembly constituted by all the active members and by a Council constituted by representatives of four of its active members, the President, the Treasurer and the Executive Secretary.

For practical reasons the functions of these governing bodies are delegated to an Executive Committee constituted by the President, Vice-President, Treasurer, and Executive Secretary.

E. Finances

The work of the CPANT is financed by proportional dues based upon the economic resources of the respective member countries. The Constitution makes provisions for receiving special funds from official or private institutions, with or without the obligation of studying a definite work plan, that in the judgment of the CPANT has a general interest.

F. Functioning

From a technical point of view, the Council, in accordance to the needs and possibilities, establishes a work program and authorizes the formation of the necessary committees for the development of the program.

This is communicated to the members of CPANT, inviting them to participate in the study groups and asking for volunteers to sponsor the

corresponding Technical Secretariat.

From the results of this inquiry the Technical Committees are organized. The country which has accepted the Technical Secretariat prepares a draft Recommendation of the assigned matter and sends it to all the members of the Technical Committee, with the purpose of collecting comments and objections which will have to be resolved within the Technical Committee.

As far as possible all the consultations must be made by correspondence, but if the nature of the work suggests it, a meeting can be held. Once the problem has been resolved within the Technical Committee, the proposed Recommendation is submitted to the General Secretariat to be circulated among the remainder members of CPANT. If this shows a favorable result, the proposal is approved as a Recommendation; otherwise it is sent back to the study group for their further consideration.

G. Recommendations

The Recommendations will cover all the matters pertinent to standardization: basic standards for dimensions, symbols, etc., nomenclature, tests, raw materials, manufactured products, equipment, etc.

These projects should be considered on the Pan-American level, with the same criteria as on the national level. In other words, they should result from a voluntary agreement among parties. Their authority will come from their application and from the demand of the consumer, and not from legislation.

Presently there are no existing Recommendations, because the organization, due to limited funds, was really only able to start significant operations in April 1961, and it had been necessary to organize the work and particularly to secure an active and effective participation from the members.

AMERICAN BUREAU OF SHIPPING[1]

A. Origin

The American Bureau of Shipping had its inception in the American Shipmaster's Association, which was organized in 1860 and incorporated a year later through an act of the Legislature of the State of New York.

B. Constitution and Management

The American Bureau of Shipping is a technical organization furnishing a service to ship owners throughout the world by setting standards of seaworthiness and administering them impartially. It is a non-profit corporation supported by fees paid to it by the ship owners who avail themselves of its services. While the Bureau is recognized by the Governments of the United States and many other countries who have delegated certain technical functions to it, the Bureau is not a government agency, and its services are employed by owners of vessels under all flags.

The management of the Bureau is vested in a Board of Managers elected by the membership, a self-perpetuating body of representative individuals engaged in all parts of the marine industry. Committees drawn from among the leading naval architects and marine engineers advise the Bureau staff on technical matters.

C. Organization

The Technical Staffs in the head office, with branches in three overseas areas, carry on the approval of plans in accordance with the written requirements of the Rules. The Surveyors stationed in the

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[1] Excerpted from private communications of R. C. Christensen, Chief Surveyor, American Bureau of Shipping, and from Reference 46.

shipbuilding yards examine the work as it progresses and witness tests to verify that the vessel is built according to the approved plans. The Surveyors in various ports of the world carry out the periodical surveys required for maintenance of classification and for any other purpose when requested by the owners, such as after a damage.

The organizational arrangement consists of the individual Surveyors under the charge of a Principal Surveyor in most ports where more than one Surveyor is stationed. Large areas of the United States, such as the Great Lakes, the West Coast and the Gulf Coast also have a Principal Surveyor in charge of that area. Abroad there is a central office for the Mediterranean, another for Western Europe, and another for the Orient.

These major areas report to the office of the Chief Surveyor at the Bureau's home office in New York. There are approximately 378 Surveyors and Principal Surveyors throughout the world. In some smaller ports within a major area the man in charge may have the title "Senior Surveyor" rather than Principal Surveyor. The Technical Staff also consists of Surveyors, Senior Surveyors in charge of particular types of work, and Principal Surveyors for Hull and for Machinery. These in turn are under the charge of a Chief Surveyor--Hull and Chief Surveyor--Machinery who work directly with the Chief Surveyor. Some of the personnel associated with the Technical Staffs are assigned to what is termed "Operations", providing a link between the home office, the Technical Staffs, and the Surveyors in the field.

D. Rules

The fundamental principle is that the Rules express satisfactory experience in service. The Rules as they exist today are the result of

long, slow growth with slight changes from year to year to keep pace with progress in shipbuilding practice. The preparation of rules is done by the Technical Staffs and they are approved first by the appropriate committee, which reports to the Technical Committee. Revisions to the Rules may come about through the suggestions of the ship owners, the shipbuilders, or from within the Bureau. After investigating the effect of a proposed rule change the staff presents a specific proposal to the cognizant committee and if recommended by that committee to the Technical Committee the change is adopted. Interpretations of the Rules are made by the office of the Chief Surveyor, although it seldom becomes necessary to rule specifically on an interpretation.

The ABS Rules possess the authority of the committees which have adopted them. These committees consist of representatives of the leading naval architects, shipbuilders, machinery builders, ship owners and operators, and as a result the findings of an ABS committee can be said to be representative of the industry's view. While there is no enforcement mechanism, classification is a service requested by the owners voluntarily and in order to obtain the benefit of this service they adhere to the requirements of the Rules. If a vessel is not in compliance and any legal question arises as to the seaworthiness of the vessel the Classification Society is unable to support the owner's position that the vessel was seaworthy. In a sense, therefore, the Rules are self-enforcing.

E. Certificates

Classification certificates are issued by the head office after the reports of the Surveyors, recommending that a vessel be classed, have

been approved by the Classification Committee. The great majority of vessels presented for classification are newly built, and have been constructed in accordance with the Rules throughout, their plans having first been approved by the Technical Staff, the materials having been made and tested according to the Rules, and the Surveyors having witnessed the fabrication and final testing. When vessels have been fully and satisfactorily inspected during construction in this manner, the classification assigned by the Committee contains the symbol ✠, indicating survey during construction.

Vessels already in service are sometimes presented for survey with a view to classification. When such a vessel has been built to the rules of another recognized classification society and has had a period of satisfactory operation of at least a year, the Bureau may grant classification to it, but without the symbol ✠ mentioned above. Before any classification would be recommended, however, the Committee would want to be satisfied that the materials were of a satisfactory quality, that certain features of construction required by ABS were either existing or added, and that the vessel was in good condition in all respects. A vessel built without classification would require a most careful survey and investigation of materials and a review of the service record.

Seaworthy certificates are issued by the Surveyors when some incident has occurred to a vessel which has caused damage or the master suspects it may have. A vessel in valid class is presumed to be seaworthy except when some such incident occurs; the owners or master call in the Surveyors to determine the extent of damage, if any, and when repairs are made (temporary or permanent) or it is found none are needed, the

Surveyor can issue a certificate stating his opinion that the vessel is seaworthy. Such certificates are never issued to vessels which are not classified by the Bureau.

The first certificate issued to a completed new vessel by the Surveyors is sometimes also called a Seaworthy Certificate. It is actually the Interim Classification Certificate by which the Surveyors who attended a vessel during her construction convey their recommendation to the Committee that she is considered fit for classification and that she is seaworthy, in the Surveyors' opinion. This statement of the Surveyors is normally considered equivalent to classification in the interim between completion of the vessel and formal action by the Classification Committee.

It is sometimes a condition of the financial arrangements of ownership or chartering that a vessel be maintained in classification. To satisfy this condition the operators often ask the Bureau for a "Confirmation of Class Certificate." This certificate is issued only by the head office based upon the latest information received from the Surveyors. It is sometimes necessary to obtain cabled reports from the Surveyors, if the vessel is undergoing survey or recently completed a survey.

Reports of all surveys carried out by the Surveyors are sent to the head office and, as a service to the owners, copies of these reports are made available to them. Contents of these reports, as well as the information contained in plans or correspondence, are treated as confidential between the Bureau and the actual owner of a vessel, and never divulged to others without specific authorization of the vessel's owner.

E. Other Activities

Another function of the Bureau outside of the sphere of the Classification of Ships is the testing by its surveyors of cargo-handling gear on board ship. This is done at the request of ship owners and safety certificates are issued which are recognized by the United States Coast Guard.

In accordance with the provisions of Appendix A of Regulations of the National Fire Protection Association governing marine fire hazards adopted in 1930, all chemists who test ships' compartments, tanks, etc., as to gas content are required to be certified as to qualifications by the American Bureau of Shipping. In order to obtain such certification, each chemist must submit his qualifications as to education, experience, and character through the American Bureau of Shipping for approval by the technologist of the American Petroleum Institute; each such certification of the chemist is valid for a period of 5 years. In conformity with this procedure the American Bureau of Shipping has certified chemists in most of the maritime States of the United States and in Canada and the West Indies, all of whom are required to report regularly to the Bureau regarding all activities related to gas-free certification carried out under their jurisdiction.

The Bureau cooperates to the fullest extent with other organizations associated with merchant marine activities. Members of its staff are represented on committees dealing with a wide variety of subjects, such as standing committees of the American Society for Testing Materials, American Welding Society, the Welding Research Council of the Engineering Foundation, American Standards Association, American Institute of

Electrical Engineers, National Fire Protection, National Safety Council (Marine Section), and technical committees of the American Merchant Marine Institute and the Shipbuilders Council of America. The technical staff carried out considerable investigation work in preparation for the International Conference for the Safety of Life at Sea held in 1929 and 1948; and for the International Load Line Convention held in London in 1930; the Bureau was directly represented on the United States delegation attending these international conventions.

G. Publications

Presently ABS has the following "Rules":

1. Rules for Building and Classing Steel Vessels.
2. Rules for the Construction of Steel Cargo Barges for Service on Rivers and Intracoastal Waterways.
3. Rules for the Construction of Steel Tank Barges for Service on Rivers and Intracoastal Waterways.
4. Requirements for the Certification of the Construction and Survey of Cargo Gear on Merchant Vessels.

The principal publication of ABS is the "Record" in which are published the essential particulars of the hulls and machinery of all vessels classed with the Bureau, the classification assigned to each particular vessel, and the dates when the various surveys were carried out. Particulars of American vessels not classed with the Bureau and also of the larger foreign vessels which regularly visit the United States ports are also given in the "Record" for the information of the subscribers.

Information concerning vessels under construction and various statistical tables are published in the "Bulletin" of the American Bureau of Shipping, which is issued monthly.

From time to time ABS finds it necessary to publish booklets dealing with certain phases of their work for the assistance of the industry. Examples of these publications are:

1. Guidance Manual for Loading T2 Tankers
2. Guidance Manual for Making Manganese Bronze Propeller Repairs

BUREAU VERITAS[1]

A. Origin

The Bureau Veritas was founded in Antwerp on July 2, 1828, under the title of "Information Bureau for Marine Underwriting."

B. Organization

The organization of Bureau Veritas may be considered under two different aspects: the technical and the geographical ones.

Technically, the organization derives from its historical development and the Society is divided into 3 main departments:

the Marine Service:

technical services,

inspection of materials and machinery,

the Aeronautical Service,

the Land Structures and Civil Engineering Service.

Those various Services are grouped together at the Head Office of the Society, in Paris. Their main work consists in guiding the interventions of Bureau Veritas representatives, centralizing the information collected by them, bringing out up-to-date editions of the different publications (of the Maritime and Aeronautical Registers in particular) and, finally, doing any kind of research work to adapt Bureau Veritas construction Rules and standard specifications to technical progress.

The last function, of course, supplies Bureau Veritas Services with their main guidance; the Services are managed by highly qualified technicians, helped by competent assistants. In order to ensure the best

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[1] Excerpted from "Bureau Veritas--Origin - Organization - Function," Bureau Veritas.

advice, Bureau Veritas, as early as 1854, thought advisable to ask the most eminent personalities in all related professions their opinion on the value of the Technical Rules; these persons formed a Committee which. except in case of war, meets regularly at the Head Office of the Society.

We must also add that Bureau Veritas is equipped with a large laboratory, the main departments of which are devoted respectively to physical and mechanical tests, chemical testing and testing of materials intended for land structures and civil engineering.

Geographically, Bureau Veritas representatives are grouped into districts, sometimes divided into sub-districts.

Engineers and Surveyors, specialized in every branch of activity of the Society and acting under the technical authority of the Head Office Services are at the disposal of each District.

An up-to-date list of the Districts, which are scattered all over the world, may be obtained by writing to the Administration of Bureau Veritas.

C. Technical Services of Bureau Veritas

To supply any information about the reliability of merchant vessels has been the first, and still is the most important service rendered by Bureau Veritas.

For this purpose, Bureau Veritas assigns a Class to the ships; this Class may be assigned either after completion of the construction, once the plans have been examined, the materials controlled and the workmanship surveyed, or when the ship is already in service, after a satisfactory general survey. This Class is inscribed on the Classification Certificate delivered to the Owner and published in"Bureau Veritas Register."

The Class is valid during a certain period called the "term", provided the ship has gone through the surveys prescribed by the Rules at the required times. The Class will be suspended or withdrawn when the ship has not been surveyed within the prescribed period, or if the repair and upkeep work deemed necessary has not been carried out to the Surveyor's satisfaction.

When the term is over, the Class may be renewed after extensive surveys, called periodical or special surveys.

Bureau Veritas which originated several national and international regulations, continues to take an active part in the preparation of new texts. It is thus frequently consulted on all technical matters which are more or less closely related with shipbuilding. It is empowered by most Governments to make sure that Conventions and International Regulations are respected, and deliver the corresponding certificates (freeboard, safety certificates, etc...). Finally, many of its representatives act as expert, either in law-suits or in equity and arbitrations.

Classification of Ships.

As above stated, Bureau Veritas infers the reliability of a ship from a first survey. This survey applies to the hull as well as to the propelling apparatus, and to the principal auxiliary machines, electrical installations, pumping apparatus, equipment, etc... Generally speaking, everything concerned with the strength and safe working of the ship is surveyed; Bureau Veritas may, in addition, be required to survey refrigerating installations, hoisting apparatus, arrangement of subdivision units, fire-protection appliances, etc.

This first survey may be carried out:

--During construction: the ship is built under special survey, which implies approval of the plans, control of the materials used in the construction, survey of the construction at the shipyard and inspection at the makers' works of the propelling apparatus and main auxiliaries; when, exceptionally, the materials are not controlled at the makers' works the ship is said to be built under ordinary survey.

--After construction: a shipowner may wish to have Bureau Veritas class a ship when she is in service. The same principle is applied but the extent of the surveys and the way they are carried out take into account both the characteristics of the ship herself and the conditions of her service.

Appreciation of the Ship's Condition

a) Construction Marks:

Bureau Veritas conclusions are expressed through a group of symbols, letters and numbers. The first of these represents the mode of classification:

mark shows that the ship has undergone special survey for classification,

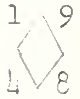
mark shows that the ship was classed after ordinary survey or after construction,

mark can be granted to ships classed after construction when built under special survey of another Register.

Those signs are sometimes completed by marks concerning: anchors and chains (A & CP marks), the special service in which the ship is engaged ("Ore", "Oil in bulk", "Wine in bulk" marks, etc...), any special strengthening ("Ice" mark, etc...), or fire-protection ($\mathcal{F}$ mark). The

granting of those marks is subject to the observance of special Rules prescribed by the Society.

Finally, the Division Number, to which we shall refer, is framed by a special sign for ships having complied with either Bureau Veritas subdivision Rules, or those of the International Conventions. Example:



b) Division:

For steel vessels, the Division, represented by Roman numbers I or II depends upon the scantlings of the ship: division I corresponds to scantlings in exact conformity with the provisions of Bureau Veritas Rules and division II to scantlings reduced as permitted by the Rules.

For wooden ships, the division symbol is replaced by a group of 2 numbers, the first one representing the type of the ship and the second her term of classification.

c) Character:

The Character, which is an essential part of Bureau Veritas opinion of a ship, is expressed by a fraction: 3/3 is granted to ships in excellent condition, 5/6 to those whose condition is comparatively less suitable and efficient.

The Class mark is completed by a group of 2 numbers: the first one indicates the condition of the hull of wooden vessels, or of the wooden parts of the hull for steel ships; the second one concerns the condition of rigging, anchors and chains: number 1 means excellent condition, number 2 a comparatively less suitable and efficient state.

d) Navigation and Service Marks:

Ships are granted a conventional letter indicating the kind of navigation or service for which they are considered suitable:

Examples for steel ships:

L (distant trade ship), R (roadstead service), S (tugs).

Examples for wooden ships:

"Pêche" (high sea fishing ships), "Petite Pêche" (ships fishing along the coasts).

If necessary, those marks can be supplemented by notes restricting the area of navigation, or the contemplated service.

e) Examples:

In order to make the above descriptions of symbols and marks quite clear, the following cases are quoted as illustration:

12-4 3/3 P 1. 1.:	hard wood ship, assigned to small coasting service, classed after construction (that is under ordinary survey), whose term of classification is 4 years. In excellent condition.
$\overset{1\quad 9}{\underset{4\quad 8}{\langle \mathrm{I} \rangle}}$ F 3/3 L, 1. 1.: A & CP	high sea passengership built under special survey and complying with the provisions of London 1948 International Convention for subdivision and fire-protection. Excellent condition. Anchors and chains have been tested in presence of Bureau Veritas surveyors.

Certificate of Classification

The Classes granted are entered on the Certificates of Classification delivered to the shipowner. The surveys performed during the term

The confirmation of the Class are entered as visas on the certificate which thus presents a brief résumé indicating the condition of the ship.

Confirmation and Renewal of Class.

As explained above, the Class is valid for a certain period called "term", provided the ship is kept in good condition.

This is ascertained by regular surveys--mostly yearly visits--for which the ship is put in dry-dock. In case of damage, or when alterations to the ship's structure or its seaworthiness have been effected, the repairs and alterations must be approved and surveyed by Bureau Veritas.

Once the term, which is normally 4 years for sea-going ships, has expired, the Class may be renewed after a special survey.

This survey includes a dry-dock survey of the hull and an inspection of the machinery; the opening-ups to be effected and, where required, the necessary drillings are listed in the Rules.

Let us add that, in order to interfere with the service of the ship as little as possible, surveys may be partial and distributed over the term, in accordance with the programme established by Bureau Veritas and the ship owner.

Register.

The Class is inscribed in the Register Book, a yearly publication which supplies, thanks to its monthly supplements, up-to-date information. It publishes, under tabulated form, the main particulars of the classed ships, such as the name of the ship owner and builder, place and date of build, characteristics of propelling and auxiliary machinery, etc.

The Register and its supplements mention the last surveys, the

suspension, withdrawal or modification of the Class, at the same time as they contain the latest information issued about the ship.

Bureau Veritas Rules.

Bureau Veritas issues Rules for the construction of ships of any type.

Those documents are constantly revised to keep abreast of technical progress; they determine every essential scantling of the hull and of the propelling and auxiliary machinery; they contain numerous prescriptions for safe operation, define the characteristics of the materials to be used for construction, and fix the intervals between the surveys the ships must undergo, and their extent.

D. Inspection of Materials and Machinery

We have already seen that the special survey effected during construction involved an inspection at various works, of the materials to be used and of the apparatus which is part of the ship's equipment. Bureau Veritas then decided to perform a similar office for materials and machinery of any kind.

Shipbuilding Materials

The characteristics which the materials and apparatus intended for shipbuilding must possess, the number and nature of the mechanical, physical or chemical tests to which they must submit are listed in Bureau Veritas Rules. Parts having satisfied the required tests are stamped for identification and are given inspection certificates, to which reports and test-tables may be annexed if necessary.

An inventory of the materials and apparatus submitted to Bureau Veritas control is, of course, a rather long one, as it starts from the

raw materials to cover all the completed products composing the vessel. We quote some of the most important: plates and sections (hull, boiler, etc.), forged and cast parts (stem and stern-post, engine frames, etc.), piping (exhaust pipes, cargo-loading pipes, etc.), electrical apparatus (dynamos or alternators, motors, switchboards, cables, etc.), cargo handling machinery, steering gears, anchors and cables and windlasses.

The range of the trials is very wide. There are physical tests (aspect, size, grain, etc.), mechanical tests (extension, rupture, bending, impact, alternate stress, creep, etc.), chemical and electrical tests, etc. There are also, for certain machines, bench tests (propulsion engines, important auxiliary machinery, etc.), and final tests are made at the shipyard after fitting on board and at the sea-trials.

Materials Not Intended For Shipbuilding.

From the foregoing, it may be inferred that Bureau Veritas has acquired invaluable experience, both theoretically and practically, which has enabled the Institution, in the course of time, to spread its control activity beyond the naval field.

The Society, consequently, inspects now many raw materials such as ores, coal, plates and sections, concrete, concrete reinforcement bars, etc., as well as the most complicated industrial installations: Sugar-mills, thermic and water power generating stations, railway rolling-stock, etc.

As for shipbuilding materials, the interventions of Bureau Veritas result in affixing identification stamps or marks on materials complying with requirements and in granting "control certificates". The Society can also provide any additional technical information such as delivery

or progress reports, and reports of shipment at docks.

As for shipbuilding, Bureau Veritas studied standard specifications for the most common materials, issued under the title of "Technical Conditions". However, the variety of the inspections and the world-wide extent of the interventions do not permit resorting to detailed Rules as those could not properly cover the whole field of engineering; and accordingly controls are mostly intended to ascertain conformity with the provisions laid down by clients in their contracts, or with any technical specification of their choice.

Here again, Bureau Veritas experience, the information it can obtain thanks to its representatives in every country and the documents at its disposal, enable it to fulfill any mission within the scope of its normal activities.

E. Aeronautical and Automobile Service.

The Aeronautical Service fills the same role for aircraft as the Marine Services for ships: it assigns a Class and makes surveys at regular intervals; it also publishes a yearly Aeronautical Register.

Bureau Veritas controls, in the first place, the construction of aircraft in accordance with the national technical requirements; this corresponds to building under special or ordinary survey--as the case may be--for ships. If that happens to be impossible, classification is granted at the end of more or less extensive surveys, according as the construction has been controlled by another approved organization or not.

When these controls or surveys are completed, a Class may be granted to the aircraft if it is found technically fit for flying.

The assignment of the Class and the interventions essential for its

maintenance or renewal, form the "stipulated activities" of Bureau Veritas, so called because such a role, in France, is played within the scope of the powers delegated to Bureau Veritas by the Government.

Those stipulated activities comprise:

--classification of aircraft and drafting of the airworthiness certificate;

--inspection of standardized production aircraft: engines, equipment, parachutes;

--continuous inspection of public transport aircraft, including both study and approval of the operational methods and timetables, and inspection of the upkeep and repair works;

--special classification surveys for aircraft which are not mass produced;

--periodical visits for aircraft not engaged into public transport;

--occasional surveys after accident or damage;

--study and approval of alterations or accommodations;

--drawing up of accident statistics.

Some foreign National Authorities have empowered Bureau Veritas to perform some or all of those operations on their aircraft whether on their own territory or on the territory of the French Union.

Classification of Aircraft

If classification is effected during construction, Bureau Veritas inspects the materials and equipment at the works, according to the builder's plans witnessed by them, and controls the assembly of the aircraft until completion; surveyors also attend flying trials.

Where aircraft already in service are concerned, classification can

be granted if their materials and construction correspond to the regulation specifications; this is ascertained by surveys of the Society's Inspectors.

Class

The Class is expressed by symbol V inscribed in the Aeronautical Register. In some cases, however, an aircraft (intended for long distance endurance flight or records) can hold V symbol without being classed.

The Class is valid for a certain period depending upon the periods between overhauls determined by the principal elements composing the aircraft, and on condition it has not suffered extensive damage, has not been engaged in undue service, and has undergone the regulation periodical surveys of Bureau Veritas.

If these conditions have not been complied with, the Class is automatically withdrawn, and the Register replaces V by R, meaning that the aircraft is no longer allowed to fly.

When the period of validity has expired, the Class may be renewed after surveys similar to those for classification after construction.

Aeronautical Register

This is a yearly publication which supplies a list of all the aircraft classed by Bureau Veritas, with their main descriptive characteristics and Class. It also contains technical descriptions of these aircraft; regular fortnightly supplements provide the latest information.

Finally, Bureau Veritas issues statistics about the civil aircraft of France, Luxembourg and Saar, at least once a year.

Other Aeronautical Activities

As occurred with the Marine Services, the experience acquired by Bureau Veritas in this field enables it to undertake any technical mission considered within its ability. For instance:

--surveys after accident,

--inspection of equipment before purchase, etc.

Automobile Activities of Bureau Veritas

The principal activities of this Branch are described hereafter:

1. periodical inspections of coaches and lorries upon request of Insurance Companies or Official Services, in accordance with the Rules set up by the Technical Service of Bureau Veritas, or according to precise standard specifications. Examples of this activity can be found in France, Morocco and Belgium.

2. technical inspection of vehicle motors and spares.

3. valuation of damages as the result of accidents, upon request of Insurance Companies or owners.

In the automobile field, Bureau Veritas has an important part to play in Belgium; it has indeed been entrusted by the Ministry of Transport with the inspection of vehicles transporting fare-paying passengers, and also of all vehicles carrying goods, in an area assigned to its care. This appointment caused the Society to build and operate 5 important service-stations in Charleroi-Montignies, Vilvorde, Hal, Mariembourg and La Louvière.

F. Laboratory

Bureau Veritas laboratory is situated at Levallois-Perret, near Paris, in premises built for the purpose; it is composed of 3 principal sections:

--chemistry,

--physical and mechanical testing,

--building materials.

We may also mention the metrological section, housed in a special building having deep independent foundations, which carries out the verification (1/1,000 millimeter accuracy) of the most precise mechanical instruments such as: workroom gauges (liners, spindles, measuring rods, micro-comparators), gauges for manufacturing castings (smooth or thread calliper gauges, buffers, thimbles, shapes, templets and taps, etc.) or any tooled castings.

Chemistry

The Chemical Section deals with any quality or quantity testing of the constitutive elements of metals and alloys (steels, cast-irons, copper alloys, light alloys, etc.), studies the characteristics of oils, petrol, paint, varnish, coal and liquid fuels, etc.)

Physical and Mechanical Tests

The section disposes of the necessary instruments to determine the properties and characteristics of the products it has to examine, whether common metals (steels, cast-iron, light alloys, etc.) or the most varied materials such as wood, fabrics, india rubber, paper, etc.

Physical tests comprise, in particular, metallographic testing for which the Laboratory is especially well equipped, in connection with the study of thermic treatment; this allows not only an investigation of the crystalline composition of metals and alloys and detection of their defects, but also a determination of the thermic treatment most appropriate to their use.

Let us finally mention the existence of modern machines which permit creep tests on metals at high temperature and under various loads lasting over a long period.

The Mechanical Section comprises classical tests for hardness, impact, resilience, torsion, compression and tension, bending, alternating stress, and also special tests such as the determination of the modulus of elasticity or of the expansion factor.

Building Materials

These materials may be mechanically tested (crushing and pull, bending) or physically tested (permeability, porosity, liability to crack through frost, shrinking, wearing away, etc.)

Moreover, special instruments determine the modulus of elasticity for compression and tension, breaking loads with measure of elongation at any temperature between 0 and 100 degree centigrade, and, finally, as an experiment, the composition of concretes.

Tightness materials are studied either alone or with the reinforcement provided for them in the building, as regards their physical and mechanical properties, at any temperature (ductility, impregnation under load, ageing, etc.) tests on various materials, are also carried out, especially on paint (artificial ageing, corrosion by sea fog tests, etc.).

G. Publications of Bureau Veritas

1. Marine Register (with monthly supplements)
2. Aeronautical Register (with fortnightly supplements)
3. Rules for the Construction and Classification of Steel Vessels.
4. Rules for the Construction and Classification of Wooden Vessels

5. Rules for the Construction and Classification of Vessels for Inland Navigation.

6. Rules for the Construction and Classification of Motor Boats.

7. Rules for the Construction of ships' lifeboats, service and emergency boats.

8. Bulletin Technique du Bureau Veritas (Technical Magazine, issued every month).

GERMANISSCHER LLOYD[1]

A. Origin

The Germanischer Lloyd was established in Hamburg in 1867 as the only German Classification Society. The Head Office, until 1945 situated in Berlin, has now taken up residence in Hamburg.

B. Organization

The Germanischer Lloyd is a Public Limited Company (Joint Stock Company) with a character of public utility.

The Head Office of the Germanischer Lloyd is situated in Hamburg. The Society's affairs are directed by the joint Management of Director Julius Heimberg and Director Herbert Torner. In their function to frame new Rules and to consider any general problems connected with the construction of ships (hull and machinery) the Management of the Germanischer Lloyd is assisted, besides the Staff of the Head Office, by a Technical Committee composed of 33 members. The Technical Committee is constituted of representatives of shipbuilders (7), marine engineers and steel makers (9), shipowners (10), underwriters (2), and of shipping and shipbuilding organizations (5).

As required by German Laws, the Management of the Germanischer Lloyd is superintended by a Supervisory Board, consisting of 9 members, viz: representatives of underwriters, shipowners, shipbuilders and engineering works. The President of the Supervisory Board is Consul Herm. Helms, Managing Director of the "Hansa" Line, Bremen.

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[1] Excerpted from a private communication of the Head Office, Germanisscher Lloyd.

The Head Office is employing about 155 persons, working in different departments such as

Dept. for Steel Shipbuilding,
Dept. for Engine and Machine Building,
Dept. for Electrical Engineering,
Dept. for Ships' Safety and Freeboard,
Research Department a.s.o., as well as
Administration Department.

C. Functions

The main task of the Germanischer Lloyd is that of classing ships, that means arranging the ships in different classes depending on their strength, their maintenance condition and their range of navigation. The respective tests and surveys required for retaining the relative class, are given in the Classification Rules.

The Construction Rules are framed by the Staff of the Head Office and subsequently discussed with the Technical Committee and approved of by the latter.

The Construction Rules are applicable in Germany as Rules for shipbuilding and are recognized as binding by the German Authorities. The Rules are also accepted by Authorities of a great number of foreign countries.

The Certificates issued by the Germanischer Lloyd are recognized by German Authorities as well as by a great number of foreign Authorities and are considered equivalent to the official Certificates regarding seaworthiness and safety of ships and their machinery.

The Germanischer Lloyd is further authorized to make out, in many countries on behalf of the competent Authorities, Load Line Certificates and Safety Equipment Certificates for seagoing vessels. The Society is recognized internationally by all major underwriters of ships.

D. Activities Abroad

The Germanischer Lloyd is represented by Branch Offices (Hull and Machinery) in all German ports and towns with shipbuilding and related industries. In addition, hull and engineer surveyors are employed by the Germanischer Lloyd in the most important ports of all countries in the world.

E. Non-Marine Work

The Germanischer Lloyd carries out inspection work of a non-marine nature, primarily the testing of products of the steel manufacturing industry, such as power machines, power consuming machines, machine tools, electrical equipment and installation, but also plywood, etc.

F. Rules

The Germanischer Lloyd has the following "Rules":

1. Rules for Classification of Seagoing Steel Ships
2. Rules for the Construction of Seagoing Steel Ships
3. Rules for the Classification of Machinery Installation in Seagoing Vessels
4. Rules for the Construction of Machinery of Seagoing Vessels

G. Register Book

The Germanischer Lloyd publishes annually the Register Book, which lists the ships classed, their particulars and gives the assigned class.

LLOYD'S REGISTER OF SHIPPING[1]

A. Its Place in History

Ship classification of some kind was known in the ancient world and in mediaeval Europe but the direct ancestor of modern classification was undoubtedly the London underwriters' committee of 1760. Today classification societies exist in a number of maritime countries. The features which combine to distinguish Lloyd's Register of Shipping are its freedom from governmental influence (there are no government representatives on the General Committee), its absence of shareholders, and the fact that classification with the Society is entirely voluntary.

In the middle of 1961, more than 200 years after the formation of the underwriters' committee, nearly half of the entire shipping of the world was classed with Lloyd's Register of Shipping and 49 percent of the tonnage under construction was to the Society's class.

B. Constitution and Management

The Society came into being in 1760 because the shipping community took steps to provide for itself a service which it required. Today it performs basically the same service for, and under the control of the same community. Direction of the Society's affairs is in the hands of the General Committee, composed now of underwriters, shipowners, shipbuilders, marine engineers, steelmakers and representatives of various shipping and shipbuilding

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[1] Excerpted from "Lloyd's Register of Shipping--What it is... and the Work it does", Lloyd's Register of Shipping.

organizations, all of whom serve voluntarily. Although, as mentioned, the Society is independent of any official control, its authority is such that classification by Lloyd's Register of Shipping is accepted by all maritime Governments as evidence that statutory requirements in respect of structural strength have been met.

C. Committees

National Committees, of similar composition to the General Committee, now exist in Australia, Canada, Denmark, France, Greece, Holland, India, Italy, New Zealand, Spain, Sweden and the U.S.A.; the special interests of Scotland and Liverpool are also represented by Committees.

The Chairmen of all the National Committees are ex-officio members of the General Committee and in addition each National Committee is entitled to elect a representative to the Technical Committee. This latter body, established in 1890, is responsible for recommending to the General Committee alterations in the existing rules or the adoption of new ones.

D. Finances

As the Society has never had stockholders, shareholders, proprietors, owners, etc., of any kind, it follows that no profits or dividends have ever been distributed. The funds and accounts are under the sole authority and control of the General Committee. Its income is derived from the fees charged for the services of its surveyors, and from subscriptions to the Register Book, etc.,

and is devoted, under the Committee's directions, exclusively to the operation of the Society for the benefit of its clients.

E. Staff

The Society employs nearly eleven hundred surveyors stationed at Head Office, ports and a number of inland industrial centres throughout the world. Trained in naval architecture, marine engineering and associated professions, they include specialists in various fields having application to shipbuilding, for example, electricity, refrigeration and metallurgy. With few exceptions surveyors are the exclusive employees of the Society.

F. Offices

The Society's Head Office has since 1901 been situated at 71, Fenchurch Street, London, E.C.3 and there are now some 180 "outport" offices in most countries of the world. The Society is always willing to consider requests for the establishment of offices in new areas.

The section of Head Office dealing with non-marine affairs is situated at Norfolk House, Croydon.

G. The Printing House

Since 1891 Lloyd's Register of Shipping has owned its own printing house. This was originally situated in Southwark, London, but in 1953 was transferred to new premises at Crawley, Sussex.

H. Research Laboratory

Situated also at Crawley is the Society's own research laboratory for the investigation of technical problems arising in connection with its work.

I. Classification

Lloyd's Register of Shipping derives its description as a classification society from its initial practice of grading ships into classes, but for many years now it has had only one standard--symbolised by '100A1'--to which all classed ocean-going ships are required to conform.

Nearly all such ships are built "to class" which means that, from the earliest days of their construction, they are under the Society's survey. Plans of hull and machinery are submitted by the builders for approval by the Society. If amendment is necessary, the builders are told in detail what is required. The steel is tested by surveyors at the maker's works, which must be on the Society's approved list. Forgings and castings are also inspected and tested, and the supervision continues throughout the construction of hull and machinery up to the final trials. On completion of the ship, surveyors' reports are checked by the staff at Head Office and then submitted to the Committee, who assign the class and authorize the issue of the classification certificates. Details of the construction and of the class assigned then appear against the ship's name in the Register Book, a cross indicating special survey during construction, (✠)

J. Periodical Surveys

It is a requirement of the rules that inspections should be carried out by the Society's surveyors at regular intervals during the life of a ship. It is a further requirement that repairs, whether arising from wear and tear or from damage, should be subject to survey.

A report on every survey is sent to Head Office where it is examined by a special staff of surveyors before submission to the Committee who, if satisfied, confirm continuation of class and make appropriate entry in the Register Book. A survey may be commenced at one port and continued at another, and the work involved in these periodical surveys on some 11,000 ships forms a major part of the Society's operations.

K. The Register Book

The original purpose of the Register, from which the Society takes its name, was to make known details of ships, including an assessment by surveyors of their condition. Today it both shows the results of the Society's survey work, and records the mercantile tonnage of the world, whether classed with Lloyd's Register of Shipping or not. The present Register, issued annually in four volumes and kept up to date by means of a monthly cumulative supplement, contains a complete list of the merchant sea-going ships of the world over 100 tons gross (over 36,000 in number) as well as the more important particulars of dimensions, type, etc. It also lists shipowners, shipbuilders, docks and other features.

L. Rules

Rules covering all aspects of shipbuilding which come under the Society's survey are now published annually in four languages--English, French, German and Spanish. These are issued for guidance in building and establish the standards required for classification.

With the accelerated pace of technical development, constant re-examination of the rules is required to ensure that they are

abreast of current practice. In carrying out this task the Society's Chief Surveyors have before them the records of service performance of thousands of ships compiled from surveyors' reports all over the world, together with the results of investigations by the technical research staff. Any new rules or alterations to existing ones are submitted to the Technical Committee, which consists of elected members nominated by the leading bodies representing the different sections of the industry--shipowners, underwriters, shipbuilders, engineers, steelmakers and others--also delegates from various maritime countries all over the world. Thus it is truly representative of all interests concerned.

The Technical Committee appoints special panels of experts to investigate major problems in connection with ship construction or marine engineering. Matters so dealt with during recent years have included the design and construction of welded ships, notch tough steel, oxygen enriched steel processes, heavy oil engines, gearing, welded bedplates and framing, pumping and piping arrangements and revised trawler rules. Provisional rules regarding marine nuclear propulsion have been formulated and regulations affecting tankers and electrical equipment have been revised. In addition, unified requirements for ship steel have been issued in conjunction with other classification societies.

M. Technical Records

The detailed reports on failures, defects and damages received from surveyors are analyzed and filed in the Technical Records

section in such a way that the records of any particular kind of ship or machinery, or of ships constructed in a given yard or country, and other valuable information can be readily obtained. Details of breakdowns and failures are recorded by means of a punch-card system and, although the system was inaugurated only in 1946, there are now 45,000 cards covering hull and machinery troubles. The records are the most comprehensive of their kind in the world.

In addition the Society maintains a library where more than 6,000 technical periodicals and papers are indexed every year, as well as standard publications.

N. Research on Land and at Sea

Both in establishing that new materials or designs conform with required standards, and in investigating the causes of failures in ships and machinery, the Society finds it necessary to carry out its own research, most of which is of an engineering or metallurgical nature. The Crawley laboratory is well equipped to undertake such work.

A unique service is provided by the Society's Engineering Investigation Department. This comprises a mobile team of specialists whose task is the investigation and cure of unsatisfactory performance in service of hulls and machinery. Surveyors from this Department are stationed in London and are prepared to travel, if necessary, to ships in trouble, wherever in the world they may be. The cause of failure is often obscure and examination and

measurement under service conditions are necessary preliminaries to correction. In their inquiries into the causes of defects, this mobile team of surveyors has at its disposal the resources of the Crawley laboratory.

Because of its unique experience arising from the current classification of so many ships of all types, the Society has its attention continually focused on problems requiring research and investigation, and it is therefore not surprising that Lloyd's Register of Shipping is represented on committees controlling technical research in many maritime countries.

O. Freeboard and Safety

The problem of the overloading of ships came into prominence in the nineteenth century and, while it was generally felt that some control was necessary, great difficulty was experienced in establishing suitable freeboards for all types of ships (i.e., stating the depth beyond which a ship could not be safely loaded). In 1882 Lloyd's Register of Shipping issued tables which were voluntarily adopted by many owners and subsequently formed the basis of the statutory regulations adopted by all maritime governments. Under the International Load Line Convention of 1930, all governments which are signatories to the Convention administer uniform load line requirements on ships of their registry and at the present time Lloyd's Register of Shipping is empowered to assign freeboards and to control the marking of load lines on behalf of the governments of forty-seven nations. Other work delegated to the Society

by a number of governments is the survey of ships of their flag for the issue of Safety Certificates under the International Convention for the Safety of Life at Sea, and the measurement of such ships for the issue of a Tonnage Certificate.

P. Two Centuries of Development

In its early days the Society was concerned only with the wooden sailing ship. The developments which over the last two hundred years, and particularly the last hundred, have brought into being the modern ship were at one stage completely new fields of knowledge with which the Society had of necessity to become familiar in order to carry out its job of classification. Its activities extended, as the need arose, to include iron, steel and other new materials.

Q. Non-Marine Department

Although the Society was originally built up and maintained for the benefit of the shipping and shipbuilding industries, others became aware in the course of time of the valuable help which they could obtain from a world-wide, impartial and technically experienced organization. Today the Society, through its Non-Marine Department, provides an international inspection service for many kinds of undertakings, including nuclear power projects, hydro-electric and thermal power stations, oil refineries, pipe-lines, chemical and special service plant, railway equipment, etc. This service is used regularly by government departments and municipal authorities in many different countries, including Australia, Great

Britain, Iraq, Kuwait, New Zealand, Pakistan, South Africa and Turkey, and by private industrial concerns such as the major international oil companies.

The Society's surveyors are particularly well fitted to deal with the inspection of mechanical, electrical and pressure plant during construction, and it is in this sphere that the most extensive use is made of the services of the Non-Marine Department. In the case of pressure plant, it is necessary for the Society to satisfy itself initially that the design and scantlings of the plant are suitable for its intended purpose. Inspection therefore begins with consideration of plans and the testing of materials at the steelworks and progresses through all stages of construction to the witnessing of the final test at the main contractor's works. In many cases this survey at the point of manufacture is followed by supervision of actual erection of the plant on site, and the Society has already provided such supervision for many large installations, including oil refineries and nuclear power stations. In the latter field Lloyd's Register of Shipping was appointed as the inspecting authority responsible for all the primary circuit equipment for the United Kingdom Atomic Energy Authority nuclear power stations at Calder Hall and Chapelcross, subsequently being entrusted with similar responsibilities for the British Berkeley, Bradwell and Hunterston projects, for the Italian station at Latina and for the Japanese projects at Tokaimura. Other commissions include the advanced gas-cooled reactor under construction at Windscale for the United Kingdom Atomic Energy Authority, and the high temperature gas-cooled reactor being built at

Winfrith Heath for the Organization for European Economic Cooperation. In 1960 the Society published "Provisional Requirements for the Survey of Pressure Components for Land-based Nuclear Installations".

The demand for a full inspection service at both manufacturers' works and on site is increasing, and surveyors have been stationed at sites in Australia, Britain, Canada, Europe, India and the Middle East.

Another type of service undertaken is the periodical survey of plant during its operërational life. The Society provides surveyors to take charge of the plant survey departments of several large companies.

For the manufacturer, purchaser or plant owner faced with special problems affecting the design,construction or inspection of equipment, the Non-Marine Department provides an advisory service. This is used by many industrial firms.

It should be stressed that the Non-Marine Department is not a separate section of Lloyd's Register of Shipping operating on its own. The whole of the Society's world-wide staff of exclusive surveyors and its entire technical resources are available for non-marine activities, from the shop inspection of small components to the supervision on site of the construction of nuclear pressure plant.

R. Publications Issued by the Committee of Lloyd's Register of Shipping

LLOYD'S REGISTER BOOK (Volumes I, II and III issued annually in July; Volume IV in January). The four volumes may be purchased as a set or separately.

Volume I (Register of Ships) contains the names, classes and general information concerning the ships classed by Lloyd's Register of Shipping and the British Corporation Register; also particulars of all known sea-going merchant ships in the world, and of all iron and steel ships trading on the North American Lakes, of 100 tons gross and upwards.

The Register is kept up to date by means of cumulative monthly supplements.

Volume II (Appendix) contains additional particulars of structural details, capacities, etc.,for ships other than tankers; and ships carrying refrigerated cargo; lists of changes of ships' names and compound names.

Volume III (Shipowners) contains a list of owners and managers of the ships recorded in the Register with their fleets.

Volume IV (Directory) contains lists of shipbuilders with existing ships they have built; marine enginebuilders and boilermakers; dry and wet docks; telegraphic addresses and codes used by shipping firms; marine insurance companies.

Statistical Tables are issued gratis to Subscribers to the Register Book.

REGISTER OF YACHTS. Published annually in April, this volume contains in addition to the names, classes, and detailed information relating to yachts classed by the Society, the names, dimensions, etc., of other British and foreign yachts, whose particulars are known; a list of one-design classes, and the sail numbers of certain classes of racing yachts; and much other information useful to yachtsmen.

REGISTER OF AMERICAN YACHTS. This Register is published in May, from the Society's New York Office.
This book contains the names, dimensions, and full particulars of the yachts of the United States and Canada, so far as they are ascertainable; and much other information useful to yachtsmen.

RULES FOR THE CONSTRUCTION AND CLASSIFICATION OF SHIPS, ETC.--

STEEL SHIPS. A Metric Edition is also published as well as editions in French, German and Spanish.
(Various extracts from these rules are available separately.)

STEEL TRAWLERS.

YACHTS.

GEOMETRIC PROPERTIES OF ROLLED SECTIONS AND BUILT GIRDERS

ANCHORS--APPROVED DESIGNS

PROVISIONAL REQUIREMENTS FOR THE SURVEY OF PRESSURE COMPONENTS FOR LAND-BASED NUCLEAR INSTALLATIONS--1960.

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